Spring Meeting Call Update, page 21

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Geodesy and Gravity

1919 Crustal Movements (General)
APPLICATIONS OF DEFORMATION ANALYSIS IN GEODESY AND GEODYNAMICS
A. Dermanis and E. Livieratos (Higher Geodesy and Cartography, Univ. Box 432, University of Thessaloniki, Greece)
A discussion of the role of deformation analysis is carried out with respect to its existing or possible future applications in geodesy and geodynamics. Expressions for strain tensors are given in the more general case of Riemannian spaces and specialized for Euclidean space, and the case of infinitesimal deformation. Among the various applications special emphasis is given to the study of crustal deformations of the earth, deformations of the gravity field and gravity field related deformations. Other applications are also considered, e.g., earth tides, cartography, geodetic networks, geoidal mapping, refraction. (Deformations, crustal strain, gravity field).
Rev. Geophys. Space Phys., Paper 2R1300

1999 General or miscellaneous
DIRECT INTEGRATION OF STOKES' UNDULATION AND VENING MEINESZ DEFLECTION EQUATIONS FOR GEOGRAPHICALLY-DEFINED GRAVITY ANOMALY BLOCKS.
C. Olenaan (University of Lagos, Lagos, Nigeria).
We give here a direct solution of this problem by converting, in an indirect way, the relevant integral equations over each block to their equivalent line integrals taken along and around the boundary curves of the block. Results of sample computations given clearly demonstrate the convergence and stability of these line integrals. We also computed geoidal parameters due to a 10° × 30° inner zone at 71 grid locations in Cameroon, using 1° × 1° anomalies and integration steps of 30" for the four innermost, and 10' for the rest of the blocks, and compared these with equivalent values from the [illegible] point method. This comparison yielded significant differences: mean ΔN = 2.2m, ΔN_{max} = 4.0m; mean $\Delta\xi$ = 2"3, $\Delta\xi_{max}$ = 10"5; and $\Delta\eta$ = 2"0, $\Delta\eta_{max}$ = 1"7 – which reflect the poor accuracy of the centre point method, especially for 1° × 1° blocks near the computation point.
J. Geophys. Res., Red, Paper 2B1495

Geomagnetism and Paleomagnetism

2520 Interactions between exterior sources and interior properties (magnetotelluric effects)
INDUCTION OF CURRENTS IN LONG SUBMARINE CABLES BY NATURAL PHENOMENA
A. Meloni, L. J. Lanzerotti, (Bell Laboratories, Murray Hill, N.J. 07974), and G. P. Gregori
The influence of induced currents on long submarine cables has been observed for nearly a century. The currents originate from time variations in the magnetic field of external origin (magnetospheric, atmospheric tides) and earth and ocean tides. Steady earth currents of internal origin have also been proposed as a possible source. The induced currents will depend upon the length, depth, and geomagnetic location of the cables. Present understanding of the phenomena are reviewed. Also discussed are potential scientific problems which might be addressed with data from such long cables and possible limitations on the information obtained. Such problems include studies of (i) the deep conductivity structure of the Earth, (ii) telluric currents flowing in mid-oceanic ridges, (iii) the spatial extent of external source fields, and (iv) a possible role of electromagnetic eddy currents in fluctuations of the Earth's spin rate. (Induction currents, telecommunications cables, magnetic variations).
Rev. Geophys. Space Phys., Paper 2R1945

2530 Spatial Variations (all Harmonics and Anomalies)
CORE AND CRUSTAL GEOMAGNETIC FIELDS
L. R. Alldredge (U.S. Geological Survey, Denver, Colorado 80225)
The spherical harmonic content of fields from core sources and extended crustal sources overlap so much that very long wavelength anomalies obtained by subtracting a core field model up to only degree 10 from the observations will be distorted so badly that interpretation in terms of geological sources will be very difficult.
J. Geophys. Res., Red, Paper 2B1579

2560 Time variations, paleomagnetism
PALEOMAGNETISM OF CARBONIFEROUS INTRUSIONS IN NORTH CAROLINA
C. Barton (Department of Geology and Geography, University of Massachusetts, Amherst MA 01003) and F. Brown
Paleomagnetic samples of two late Paleozoic plutons were collected from the eastern Piedmont Province in North Carolina. Results from the early Carboniferous (326±27 m.y.) Liberty[illegible] pluton, located in the Carolina Slate Belt, indicate a pole position similar to that of the medial North American craton for the lower Carboniferous. Five sites in this gabbro/granite complex give a pole of 40°N, 136°E (alpha 95=2.9). The late Carboniferous (283±6 m.y.) Churchland pluton, located in the Charlotte Belt, gives a pole of 34°N, 126°E (alpha 95=16.3) which correlates well with other North American poles for the late Carboniferous.
Observations made by Kent and Opdyke (1978) on rocks from the eastern edge of the northern Appalachians suggest gross lateral displacement between the mid Devonian and late Carboniferous in the later Paleozoic. This paleomagnetic information from the eastern Piedmont region implies that the area of the Carolina Slate Belt and Charlotte Belt was associated with the North American platform for the entire Carboniferous period. The Slate Belt rocks, although geologically a southern counterpart to some of the Avalonian rocks from the northeastern edge of North America, do not display a paleomagnetic history suggestive of great displacement.
J. Geophys. Res., Red, Paper 2B1824

2599 General
ERROR ANALYSIS FOR THE DETERMINATION OF TECTONIC ROTATION FROM PALEOMAGNETIC DATA
Harold R. Demarest, Jr. (Department of Geology, Oregon State University, Corvallis, OR 97331).
Recent determinations of tectonic rotation and flattening from paleomagnetic data have exaggerated the size of the confidence limits or error bars by about 25%. This has been caused by the misuse of conventional error propagation to derive one degree of freedom error bars from a two dimensional cone of confidence (α_{95}).
An analytical calculation, which is valid when error bars are small, shows that the correct error bars are [illegible] of the values derived in previous studies. [illegible] integration to check the applicability of the analytical solution, [illegible] when the analytical [illegible]. The analytical approximation [illegible] α_{95} is less than 10° [illegible] not too close to vertical.
Confidence limits [illegible] and flattening in [illegible] and should be reduced [illegible] error bars [illegible] interpretations [illegible]

Hydrology

3130 Groundwater
CONTAMINANT TRANSPORT IN FRACTURED POROUS MEDIA: ANALYTICAL SOLUTIONS FOR A SYSTEM OF PARALLEL FRACTURES
E. A. Sudicky and E. O. Frind (Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, N2L 3G1.)
An exact analytical solution is developed for the problem of transient contaminant transport in discrete parallel fractures situated in a porous rock matrix. The solution takes into account advective transport in the fractures, molecular diffusion and mechanical dispersion along the fracture axes, molecular diffusion from the fracture to the porous matrix, adsorption onto the face of the matrix, adsorption within the matrix, and radioactive decay. The general transient solution is in the form of a double integral that is evaluated using Gauss-Legendre quadrature. A transient solution is also presented for the simpler problem that assumes negligible longitudinal dispersion along the fracture. This assumption is equally reasonable when the advective flux in a fracture is large. A comparison between two steady-state solutions, one with dispersion and one without, permits a criterion to be developed that is useful for assessing the significance of longitudinal dispersion in terms of the overall system response. Examples of the solutions demonstrate that penetration distances along fractures can be substantially larger through multiple, closely-spaced fractures than through a single fracture because of the limited capability of the finite matrix to store solute.
Water Resour. Res., Paper 2W1437

3140 Limnology
A MODEL OF LIGHT PENETRATION IN A TURBID LAKE
Heinz G. Stefan (St. Anthony Falls Hydraulic Lab., Univ. of Minnesota, Minneapolis, Minnesota, 55414), John J. Cardoni, Frank R. Schiebe and Charles M. Cooper
The attenuation of total solar radiation and of photosynthetically active radiation (PAR) in turbid lake water containing high concentrations of very fine clay particles and/or phytoplankton is analyzed. Reflectance of incident solar radiation on the surface of the same water is also investigated. A relationship is developed to predict underwater irradiance as input to phytoplankton models. Input variables consist of incident solar radiation, suspended sediment, and chlorophyll-a concentrations. Data are from Lake Chicot, Arkansas.
Water Resour. Res., Paper 2W1639

3175 Soil moisture
STOCHASTIC ANALYSIS OF ONE-DIMENSIONAL STEADY-STATE FLOW: A COMPARISON OF MONTE-CARLO AND PERTURBATION METHODS
J. Andersson (Dept. Water Resources Engineering, Inst. of Tech., S-100 44 Stockholm, Sweden) and A. M. Shapiro
The stochastic nature of [illegible] profile under [illegible] is examined [illegible] is taken as a stationary stochastic process. Different techniques are employed in determining stochastic [illegible] [illegible]

News

Special Report

Kilauea Volcano, Hawaii, USA (19.42°N, 155.27°W). All times are local (GMT—10 hours). The following report was provided by the USGS Hawaiian Volcano Observatory. *SEAN* summary.

Eruptive Activity

An eruption in the E Rift Zone of Kilauea Volcano began at 0031 on 3 January. The outbreak began at Napau Crater, 14 km SE of the caldera rim. Fountaining and production of SE-moving lava flows of local extent continued until about 1000 and progressively extended the system of linear discontinuous vents downrift to the NE, for a distance of about 4 km. Following 2½ hours of quiescence, the eruption resumed at 1425 along a 100-m-long fissure at the NE (downrift) end of the vent system. This eruption lasted nearly an hour. An estimated 3–4 × 10⁶ m³ of lava was extruded during this initial 10¼ hours of eruption.

The volcano remained quiet for nearly 2 days. At 1123 on 5 January the eruption resumed in the area active late 3 January. Here a vent system about 1 km long erupted energetically but intermittently through the predawn hours of 9 January. Ten episodes of vigorous lava production occurred. They ranged in duration from 2 min to 18¼ hours. The volume erupted from these vents cannot be measured because most of the erupted lava poured into a gaping crack that developed a few hundred m to the SE, at the N boundary of a prominent older graben.

During parts of 7 and 8 January, the main eruptive center shifted temporarily to vents located another km or so downrift. These vents erupted strongly from 1030 to 1357 on 7 January, producing a flow nearly 6 km long that extended E then turned SE. The flow, which covered about 1 × 10⁶ m², turned in a roughly 1 km from the vents and stopped nearly 5 km from the coast. A second, less voluminous eruption from the same vents from 1625 on 7 January to 0450 on January 8 produced a smaller lava flow that overrode the proximal end of the first flow.

Since early 9 January, the eruption has consisted of intermittent weak fountaining and minor lava flow production from vents about 1 km uprift from the 7–8 January activity.

Seismicity and Deformation

In the weeks prior to the eruption, seismographs recorded increasing rates of microearthquakes in the E Rift of Kilauea. At 0030 on 2 January the seismicity developed into a swarm of small earthquakes and weak harmonic tremor. The activity started near Mauna Ulu (about 9 km from the caldera rim), increased in the early hours, and migrated downrift about 9 km to beyond Napau Crater. Tiny earthquakes were recorded at a rate of 3 to 5 per min. The seismic intensity peaked between 0040 and 0110, when several earthquakes, 2.5 to 3.0 in magnitude, were felt in the Hawaii Volcanoes National Park area. Tiltmeters recorded slow deflation of the summit commencing at 0100, with the rate increasing significantly at 1300. From 0300 to 1300 the seismic zone spread several km downrift. For nearly 10 hours thereafter, and up to the time of eruption, small earthquakes accompanied by harmonic tremor occurred at a nearly constant rate, mainly along a 3-km-long zone extending downrift from Napau Crater. At 0031 on 3 January the eruption was sighted at Napau Crater by a ground crew, and seismographs started to record increasing amplitudes of harmonic tremor and constant deflation of the summit. At 1002, when the first episode of fountaining ended, tremor amplitudes decreased, deflation stopped, and rapid reinflation started. As low amplitude tremor continued, tiny earthquakes E of Napau increased. Tremor increased as eruptive activity resumed once again at 1425 and abated an hour later when the eruptive activity ended. Weak harmonic tremor continued for over a day.

From late 4 January, as the tilt pattern reversed from inflation to deflation, small earthquakes and harmonic tremor gradually increased near the eruptive fissures. By 0500 on 5 January the seismicity had increased noticeably, and [it] continued to increase until lava fountaining resumed at midday. Tremor levels remained generally high during the eruptive episodes from 5–9 January, with amplitudes peaking during strong fountaining and diminishing during low activity. The maximum tremor amplitudes recorded were from 1200 to 1600 on 7 January, coincident with the high rate of lava production that fed the 6 km flow that advanced toward the coast.

Geoelectric and recorded tilt changes on 3 January strongly suggested that magma was intruding the E Rift Zone to about 3 km downrift from the vents active at that time. However, observations of ground cracking, tilt measurements, and electronic distance measurements showed that the major extension perpendicular to the rift zone occurred N and NE of that area late on 6 January and during 7 January.

As of 10 January the eruption was still in progress, though extrusive activity had diminished in vigor. Accelerated collapse of the summit had ended on 8 January and on 10 January, tiltmeters showed only minor summit deflation. An estimated 45 × 10⁶ m³ of magma had drained from the summit storage system. Harmonic tremor was strong, although somewhat below the amplitudes during periods of vigorous lava production. Frequency of shallow earthquakes in the rift zone had declined, and this indicated that no major migration of the dike system was in progress.

Information contacts: Edward Wolfe, Arnold Okamura, and Robert Koyanagi, USGS Hawaiian Volcano Observatory, Hawaii Volcanoes National Park, Hawaii 96718 USA.

IGY Commemorated

Resolved, *That the House of Representatives commemorates the 25th Anniversary of the beginning of the International Geophysical Year [IGY], and reaffirms the commitment of the House of Representatives to a new, vigorous era of international cooperation in all the sciences.*

IGY·25 1957–1958

The House of Representatives unanimously passed this resolution, H.R. 514, just before the close of the 97th Congress. The resolution 'mentions just a fraction of the scientific advancements achieved during the 18-month period of IGY,' Tim Wirth (D-Colo.) told colleagues in the House. He introduced the resolution last June and testified before the House Science and Technology Committee on behalf of the resolution (*Eos*, August 24, 1982, p. 617).

'Aside from the marvel of launching artificial space satellites and the intensive exploration of our planet, IGY brought a continuing flow of important scientific knowledge to our society,' Wirth said. 'IGY's remarkable accomplishments have led to varietal improvements we now take for granted, such as refined methods of weather prediction and space exploration. In addition, IGY has had a lasting beneficial impact on cooperative scientific programs—a global network of the world's finest scientists know each other and continue to work together.'

Reaffirmation of the House's commitment to international scientific cooperation in the future, the second part of the unanimously approved resolution, could portend more wholehearted support for science funding. The 98th Congress will begin work on the fiscal 1984 budget next week when President Reagan is scheduled to send his budget proposal to Capitol Hill. In mid February, *Eos* will publish an analysis of the President's budget as it relates to geophysics and earth sciences.

Wirth explained why he included the reaffirmation in the resolution: 'We need to reaffirm our commitment to a new era of peaceful international cooperation in the sciences. My resolution reaffirms our commitment despite signals from the Reagan administration that it is willing to diminish our participation in international science programs. Our nation cannot afford such a retreat, and I fear our world cannot long survive in an atmosphere of conflict instead of cooperation.'

The complete text of H.R. 514 appears in the December 21, 1982, *Congressional Record*.—*BTR*

Field Studies Courses Open

Fourteen month-long courses combining applied academics with training in field research methodology are being offered this summer by the School for Field Studies. The courses, held in eight countries during May, June, July, and August, provide unique opportunities for participants to work as a team under primitive conditions.

'Our courses bind together the academic challenge of the research problem, the physical challenge of the site itself, and the interpersonal challenge of the expedition team in a dynamic way so that both cognitive and affective learning are accelerated,' according to Jim Elder, the school's director.

The courses to be offered this year are explosive volcanism (in Landmannalaugar, Iceland); environmental geology (Landmannalaugar, Iceland); community ecology (Mount St. Helens National Monument, Washington); limnology and acid rain (Adirondack Mountains, New York); marine mammal biology and conservation (Glacier Bay, Alaska); wildlife management (Athi Plains, Kenya); wildlife resource selection (Athi Plains, Kenya); population dynamics of endangered species (Theodorou, Crete); ecosystem management (Canyonlands National Park, Utah); alpine plant ecology and land use (Obergurgl, Austria, and Davos, Switzerland); ecology and national park planning (Atarama Desert, Chile); arctic botany (Brooks Range, Alaska); cetacean behavioral ecology (Gulf of Maine); and coral reef ecology (St. John, U.S. Virgin Islands).

Many students receive academic credit for the courses taken with the School for Field Studies; each month-long field course is nearly equivalent to a full-semester college course. Affiliation agreements with several northeastern universities are being negotiated to facilitate the awarding of credit.

Applications for 1983 courses are being accepted and will be reviewed on February 1, March 1, and April 1 to fill expedition teams, which will average 12 students and two faculty leaders each. For additional information, contact the School for Field Studies, Room 201, 50 Western Avenue, Cambridge, MA 02139 (telephone: 617-497-9000, ext. 212).

Books

Tropical Cyclones: Their Evolution, Structure, and Effects

R. A. Anthes, *Meteorol. Monogr.*, vol. 19, no. 41, American Meteorological Society, Boston, Mass., xvii + 208 pp., 1982, $40.00.

Reviewed by D. Cadet

This book gives the state of knowledge about tropical cyclones. After the introduction, which stresses the socioeconomic importance of these phenomena, the reader becomes excited to know more about one of the most powerful perturbations of the atmosphere. All the aspects of the phenomenon are treated. Thus, an entire chapter is devoted to the interaction between storm and ocean.

The introduction begins with some history about the first descriptions and understanding of tropical cyclones. It is followed by their socioeconomic impact. Their influence can be illustrated with numbers taken from the book: Each year an average number of 20,000 deaths and economic loss of $6–7 billion.

In the second chapter, the author describes the structure and life cycle of cyclones. This knowledge has emerged mainly after World War II and followed the implementation of upper-air stations and from the flights of instrumented aircraft. On the basis of figures taken from different papers, the structure of tropical storms appears clearly. The author tries to explain the formation of the eye, which is one of the most striking features of the phenomenon. The role of different parameters in cyclogenesis is largely discussed.

After this description, the physical processes are exposed. Tropical cyclones are sustained with the large amount of latent heat released in intense convection. As convection depends mainly on eddy transfers of heat, moisture, and momentum at the sea surface, processes occurring in the boundary layer are described. Large amounts of water vapor are supplied to cumulus convection: Frictionally induced convergence of water vapor is about 2–5 times the water vapor released through evaporation. The author points out that although condensation of water vapor as a primary source for hurricanes has been recognized for a long time, the details of how intent heating produces the genesis are still not well known. The interaction between the environment and the clouds is discussed as well as cumulus parameterization schemes. The differential radiative cooling which may play an important role in the early stages of a storm's development is finally described.

Chapter 4 is devoted to numerical modelings. First efforts began during the 1960s with the development of axisymmetric (two-dimensional) models. Although the understanding of tropical cyclones was largely improved, they were not suitable to model storms because they were uncapable of treating asymmetric effects and the interaction with the environment. The introduction of Kuo's cumulus parameterization scheme was important in the development of successful models. One of the problems of three-dimensional modeling is due to the different scales needed to represent the different parts of a storm. Near the eye, a fine mesh grid is necessary, whereas outside, a coarser mesh grid can be used. The major objective of these models is for operational purpose, and the initialization with observed data is important. Some of the tables found in this chapter are of considerable interest because they give a complete list of models as well as parameterization schemes they used.

For a long time, some meteorologists have dreamed to modify hurricanes. The first seeding was performed in 1947, and the major program was the project STORMFURY. There is some experimental evidence that shows that seeding seems to reduce the intensity of tropical storms. However, the number of experiments is too small to be statistically significant. Numerical models are also used to test the hypothesis. It must be noted that the author's opinion is that the impact of seeding is minimal when compared with natural changes in the storm.

In the first part of chapter 6, the interaction between storm and ocean are examined. The most observable effect is the decrease of SST after the passage of a storm due to upwelling and mixing. Linear and nonlinear models of oceanic responses are described. Tropical cyclones are deadly phenomena because of surges occurring during landfall over low-lying areas. This question is treated in the last part of the chapter.

The last chapter is devoted to the question of forecasting which is the main objective of research. The author reviews the different methods based on statistical and dynamical models. In the first category, it is noteworthy that even a simple model compares favorably with more complicated models. It is striking that although the understanding and modeling of hurricanes have largely progressed during the last 20 years, the reduction in tropical storm position errors for 24-hour forecast between 1968 and 1966 is only 10–12% (similar trend prevails for the period 1967 to present). However, this conclusion must be tempered by the fact that the population of cyclones is not the same for differ-

ent years. Another parameter that is more important is the landfall position: During the 1970s, the average error was only 59 nm. The author points out that improvement will come from a better knowledge of initial conditions and development of better parameterization schemes to represent physical processes.

This book is very valuable to anybody interested in tropical cyclones. The only major shortcoming is that it contains no presentation of the impact of satellite information on the understanding and forecasting of tropical storms.

D. Cadet is with the Department of Meteorology, Florida State University, Tallahassee, Florida.

Numerical Solution of Partial Differential Equations in Science and Engineering

L. Lapidus and G. F. Pinder, Wiley-Interscience, New York, 677 pp., 1982, $44.95.

Reviewed by Herbert F. Wang

The book by Lapidus and Pinder is a very comprehensive, even exhaustive, survey of the subject. The dust jacket accurately labels the book as a reference/text. In the first three chapters a brief introduction is given to the terminology of partial differential equations followed by a very good description of the basic concepts of finite difference and finite element techniques. The final three chapters deal individually with parabolic, elliptic, and hyperbolic equations. The book is unique in that it covers equally finite difference and finite element methods. Smaller coverage is given to collocation and boundary element methods.

The book is a universal treatment of numerical methods. Discipline-oriented treatments also exist. For example, Pinder is coauthor of *Finite Element Simulation in Surface and Subsurface Hydrology*.

The authors emphasize model equations, i.e., $u_t = u_{xx}$, $u_{xx} + u_{yy} = 0$, $u_t + u_x = 0$, where the subscripts indicate partial derivatives, in order to discuss solution techniques, convergence, and stability. Thus, if one needs to choose between ADI, LSOR, LOD, etc., to solve one's particular problem, then here is the source to find a discussion and comparison of the techniques.

The book is written clearly enough. The text is taken with equations as might be expected. A nice feature of the book is the clear illustrations that show computational schemes or finite element basis functions. It is relatively clean of mistakes, although the running head is incorrect for twenty pages and a few typos exist. Sometimes, notation is not quite consistent or adequately explained. Some direct repetition occurs. For example, the finite difference formula for irregularly spaced grid points is given once in chapter 2 and again in chapter 5. Indirect repetition occurs when certain developments in finite difference or finite element methodology are used in the context of different equations. The sheer tediousness of analyzing many specialized methods occasionally strikes the authors also and so we find [p. 417] 'We could finally turn to an analysis of the SSOR, USSOR, MSOR, ... methods. However, this goes beyond our durability. ...'

Mathematics, even what is called applied mathematics, tends to be more abstract than meets the interests or needs of the scientist or engineer. That the authors of a book on numerical solutions of partial differential equations should be in the fields of chemical engineering and hydrology, respectively, reflects the trend that the numerical methods texts are being written by those who actually carry problems through to a solution. However, this text is still an important practical step away from the solution to a problem. The finite difference or finite element theory needs to be coded into a computer program, a step that is not treated in this book or in most books of its genus.

Despite the awesome scope of the book, I feel that it could have been whittled down some. At many points the discussion becomes a summary of papers in the literature. The book could use, to coin a phrase, one more iteration. Right now the book probably serves its reference function better than its text function. The book is an especially valuable resource for its treatment of the finite element method as a numerical technique for the solution of partial differential equations.

Herbert F. Wang is with the Department of Geology and Geophysics, University of Wisconsin, Madison, Wisconsin.

Thermodynamics of Minerals and Melts

R. C. Newton, A. Navrotsky, and B. J. Wood (Eds.), *Adv. in Phys. Geochem.*, vol. 1, Springer-Verlag, New York, xii + 304 pp., 1981, $39.80.

Reviewed by Douglas Rumble

The book, *Thermodynamics of Minerals and Melts*, edited by R. C. Newton, A. Navrotsky, and B. J. Wood, is volume 1 in the series *Advances in Physical Geochemistry*, with S. K. Saxena as series editor. The volume is divided into three parts: (1) general principles, (2) thermodynamic analysis of mineral systems, and (3) thermodynamics of melt systems. Part 1 had one paper on the derivation of J. Willard Gibbs' mathematical formulation of the combined first and second laws of thermodynamics for an open system by G. Tunell. Part 2 covers the following topics, listed with authors: thermodynamics of devolatilization reactions [T. J. B. Holland], 'lambda' transitions in minerals [A. B. Thompson and E. H. Perkins], crystal-field effects on thermodynamic properties of iron-bearing minerals (B. J. Wood), stable isotope geothermometry (R. N. Clayton), calculation of thermodynamic properties of minerals from natural parageneses [L. L. Perchuk, K. K. Podlesskii, and L. Y. Aranovich], thermodynamics of the garnet-plagioclase-Al_2O_3-quartz geobarometer [R. C. Newton and H. T. Haselton], and thermodynamics of diopside and enstatite solid solutions [D. H. Lindsley, T. E. Grover, and P. M. Davidson].

Part 3 contains papers on thermodynamics of molten salt mixtures [O. J. Kleppa], thermodynamics of mixing in silicate glasses and melts (A. Navrotsky), thermodynamic modeling of silicate melts (Y. Bottinga, D. F. Weill, and P. Richet), calculation of silicate mineral-melt phase diagrams [C. H. Langmuir and G. N. Hanson], and volatile interactions in magmas (J. R. Holloway).

The contributions cover a very wide range of the thermodynamic principles and methods currently being used in research on minerals and melts. For nonthermodynamicists, the book will provide an exciting overview of the capabilities and potential of thermodynamics for solving geologic problems. The papers in the volume are sufficiently detailed, however, that those interested in using thermodynamics in their own research will find them useful.

The level of presentation is appropriate for graduate students in mineralogy, petrology, and geochemistry; however, the work is not a systematic textbook. Certain papers, such as that by G. Tunell, should be required reading for students in a general course of physical geochemistry. Many of the other contributions would be very useful as supplementary references in more specialized courses.

A comparison of the papers on minerals with those on melts gives a clear picture of the current status of research. In thermodynamic work on mineral solid solutions, it is virtually taken for granted that crystal structure and crystal chemical data are available. For this reason, configurational entropy can be calculated for minerals with minimal ambiguity. Research attention is focused on the problem of modeling deviations from ideal mixing.

The status of thermodynamics with respect to silicate melts is quite different because it is so much more difficult to deduce the structure of melts than of crystals. The basic problem in the thermodynamics of melts is to determine the structure of melt species and their statistical distribution. Many of the papers on melts in the volume are concerned with choosing a model for calculating configurational entropy. There is not sufficient experimental evidence available, however, to support a definite choice between competing models. Those who are engaged in the task of measuring structural properties of silicate melts deserve the enthusiastic and sympathetic support of the rest of us, for the research of all petrologists will benefit from new insight into the structure of melts.

Douglas Rumble is with the Geophysical Laboratory, Washington, D.C.

New Publications

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Gravity, G. Tsuboi, George Allen & Unwin, Boston, xiv + 254 pp., 1983, hardbound $40.00, cloth $19.95.

Igneous Rocks, D. S. Barker, Prentice-Hall, Englewood Cliffs, N.J., xii + 417 pp., 1983.

Magnetospheric Plasma Physics, A. Nishida (Ed.), *Dev. in Earth and Planet Sci.*, vol. 4, D. Reidel, Hingham, Mass., xii + 348 pp., $49.50.

Underground Storage of Oil and Gas in Salt Deposits and Other Non-Hard Rocks, W. Dreyer, *Geol. of Petrol.*, vol. 4, John Wiley, New York, vi + 207 pp., 1982.

Uranium M1, P. R. Simpson, J. A. Plant, and G. C. Brown (Eds.), The Mineralogical Society, London, 216 pp., 1982, $37.50.

Classified

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POSITIONS AVAILABLE

Postdoctoral Research Associate Positions/Johns Hopkins University, Applied Physics Laboratory. Positions are available for studies of planetary magnetospheres, and for studies of earth magnetospheric and auroral physics. Selected candidates will participate in the analysis and interpretation of data obtained from deep space probes (Voyager), or particle, field, and atmospheric emissions data from earth orbiting spacecraft. Positions are one year renewable opportunities with flexible starting dates. Applications should be addressed to Mr. Steven F. Sayre, Department LER-258, The Johns Hopkins University, Applied Physics Laboratory; Johns Hopkins Road, Laurel, MD 20707.

An Equal Opportunity Employer M/F.

Earth Sciences/University of Leeds. Applications are invited for two positions available from 1 October 1983.

The appointee to the *Lectureship in Chemical Oceanography or Sedimentary Geochemistry* would preferably have interests in interactions between sediments and natural waters. Facilities exist for elemental and isotopic analyses of sea water and particulate matter. The Department is also active in related areas of sedimentology, isotope geology, sedimentary ore deposits, theoretical petrology and a range of analytical geochemistry.

The appointee to the *Lectureship in Geophysics* could have qualifications and interests in any branch of exploration geophysics or solid earth geophysics. Present activities in these areas include exploration seismology, global seismology and seismicity, palaeomagnetism, tectonophysics, gravity and magnetics and electrical methods.

The Department of Earth Sciences is an integrated geology-geochemistry-solid earth geophysics department teaching MSc in Geochemistry and Geophysics as well as undergraduates, and with a research school of 30+ students.

Salary on the scale of £6375–£13,505 according to age, qualifications and experience.

Application forms (not essential) and further particulars may be obtained from the Registrar, University of Leeds, Leeds LS2 9JT, West Yorkshire, UK.

Closing date *1 March 1983* (by telegram in the first instance if necessary for candidates outside the UK).

Isotope Geologist/University of Wyoming. The Department of Geology/Geophysics invites applications for a tenure track position at the assistant professor level in isotope geology. The applicant's field of specialty may be stable or radiogenic isotopes. The successful candidate will be expected to teach undergraduate and graduate courses and conduct his/her own research program.

Current research at the University of Wyoming includes: crustal evolution in the Archean and Proterozoic; the systematics of magma contamination; carbonate diagenesis; fluid-rock interaction; and the tectonic evolution of compressional and extensional orogenic belts. We hope the successful candidate will complement these studies as well as develop a strong, independent program. Applicants should submit a vita, transcripts, a letter describing future research interests, and names of three references to Dr. Robert S. Houston, Head, Dept. of Geology/Geophysics, PO Box 3006, University Station, University of Wyoming, Laramie, WY 82071. Closing date for applications is February 28, 1983.

The University of Wyoming is an equal opportunity/affirmative action employer.

Faculty Position in Oceanography/University of Miami. Applications are invited for a tenure-earning faculty appointment in physical oceanography; level of appointment and salary commensurate with qualifications. Applicants should have a record of scholarly publications demonstrating the ability to interpret oceanographic observations, and several years experience in planning and execution of oceanographic field experiments. Duties include teaching graduate level courses in physical oceanography and supervising research of graduate students. Send curriculum vitae, publication list and names of three references to: Dr. Friedrich Schott, Chairman, Division of Meteorology and Physical Oceanography, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Causeway, Miami, Florida 33149.

The University of Miami is an affirmative action/equal opportunity employer.

University of Kentucky/Department of Geology. The Department of Geology invites applications for two tenured track Assistant Professor level positions. Both appointments are for soft rock geologists preferably with some experience in industry and interests including one of the following: sedimentology, stratigraphy, carbonate petrology, organic geochemistry, or isotope geology. The successful applicants would be required to participate in active research, supervise graduate students and teach graduates and undergraduates. Familiarity with quantitative techniques is desired. Department has access to a variety of computational devices. Academic vitae and names of three references should be sent to Dr. Lyle Sendlein, Chairman, Search Committee, 321 Patterson Office Tower, University of Kentucky, Lexington, Kentucky 40506-0027. Closing date is March 1, 1983. Both appointments are to commence in August 1983, but an earlier date may be considered. Salary is negotiable.

The University of Kentucky is an equal opportunity/affirmative action employer.

Faculty positions/University of Texas at Arlington. The Dept. of Geology invites applications for a tenure-track or tenured position in *carbonate petrology and sedimentology*, and also a tenure track position in *petrology*, both beginning Fall 1983. A PhD and demonstrated research ability are required. Applications with resume and statement of interest should be sent by *February 15* to Dr. C. I. Smith, Department of Geology, University of Texas at Arlington, P.O. Box 19049, Arlington, Texas 76019. Letters of recommendation should be requested of three persons who are well acquainted with the applicant.

UTA is an Equal Opportunity/Affirmative Action Employer.

First Announcement
International Symposium on Deep Structure of The Continental Crust: Results from Reflection Seismology

The conference will be held during June 26, 27, 28, *1984*, on the Cornell University campus in Ithaca, New York. The technical sessions will cover, amongst others, the following topics:

- *Results of seismic reflection profiling of the deep continental crust in countries throughout the world.*
- *Structure of orogenic belts.*
- *Structure of continental rifts.*
- *Nature of the Moho.*
- *Mechanisms of continental accretion.*
- *State-of-the-art techniques in deep seismic reflection profiling.*

A comprehensive proceedings of this conference will be published.

Steering Committee of the conference:
- *Muawia Barazangi, Coordinator, Department of Geological Sciences, Cornell University, Ithaca, New York 14853, Telephone: (607) 256-6411, Telex No: 937478*
- *Albert Bally (Rice University)*
- *Robert Hamilton (U.S. Geological Survey)*
- *Leonard Johnson (U.S. National Science Foundation)*
- *Robert Phinney (Princeton University)*
- *Donald Turcotte (Cornell University)*

For additional information concerning submission of abstracts and/or to attend the conference please contact the Coordinator. Participation may be limited.

Research Positions/Lunar and Planetary Laboratory. The Lunar and Planetary Laboratory at the University of Arizona has research positions open for Planetary Scientists, with Planetary Astronomy and Planetary Geology being areas of greatest interest to the Laboratory at this time. Researchers at the Laboratory have access to the University's observatories, a wide range of astronomical instrumentation, a complete collection of planetary images, computers and laboratory facilities. The research ranks in the Laboratory, namely Assistant Planetary Scientist, Associate Planetary Scientist, and Planetary Scientist parallel the tenure track ranks of Assistant, Associate and Full Professor. The Laboratory is interested in making appointments at the Assistant or Associate Planetary Scientist level. These are not tenurable and not state-funded positions. Salary levels are commensurate with equivalent tenure-track ranks. Researchers in these positions will be expected to supply a significant portion of all of their salaries through their grants and contracts.

Applicants should submit a curriculum vita, list of publications, and the names of three references by April 30, 1983, to L. L. Wilkening, Director, Lunar and Planetary Laboratory, University of Arizona, Tucson, Arizona, 85721.

The University of Arizona is an equal opportunity, affirmative action employer.

EOS
Transactions, American Geophysical Union

Send double-spaced manuscripts (four copies) to *Eos*, AGU, 2000 Florida Avenue, N.W., Washington, D.C. 20009, or send them directly to one of the associate editors with a copy to the above address.

Editor: A. F. Spilhaus, Jr.; **Associate Editors:** Marcel Ackerman, Mary P. Anderson, Peter M. Bell (News), Kevin C. Burke, Bruce Doe, Robert H. Eather (History), Arnold L. Gordon, Gerard Lachapelle, Christopher T. Russell; **News Writer:** Barbara T. Richman; **Editor's Assistant:** Sandra R. Marks; ***Eos* Production Staff:** Patricia Bangert, Margaret W. Conelley, Eric Garrison, James Hebblethwaite, Dae Sung Kim, Vivian Nelson, Michael Schwartz.

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Cover. The El Asnam, Algeria, earthquake of October 10, 1980, with a surface wave magnitude (M_s) of 7.3, produced numerous surface fractures and large displacement fields as a result of faulting. The 3-D computer plot displays the theoretical displacement field (vertical exaggeration 5000x) caused by a complex Volterra dislocation. On the right is a dip-slip reverse fault with a rupture length of 32 km and a maximum vertical displacement ($\Delta\mu$) of 3.50 m. There are 12 segmented faults in this figure; five of them are reverse dip-slip with a 60° dip and an average strike of N45°E. The other seven faults are secondary normal faults with either a N45°E or N53°W trend. The area of secondary faulting was complex; in some places, left-lateral strike-slip motion was measured. The short-period *P* wave focal mechanism solution has a preferred nodal plane at N42°E with a dip of 60°W, which has been constrained with the *S* wave polarization obtained at several critical seismological stations in Africa. (Submitted by A. F. Espinosa, U.S. Geological Survey, Office of Earthquake Studies, Denver, Colorado.)

Would you like to be on the cover of *Eos*? Do you have photographs (preferably black and white) of geophysical phenomena? Or of unusual experimental results or graphs and charts with both aesthetic charm and scientific interest? *Eos* would like to consider them for publication on the cover. Send your favorite photo with a short (50-200 words) explanation that can serve as a caption, or you may submit a more extensive news item or even a short article to accompany a proposed cover. Captions will be by-lined. If the material has been previously published, please supply a copyright release from the original publisher. Send to *Eos* Cover, AGU Publications Office, 2000 Florida Avenue, N.W., Washington, DC 20009.

Faculty Position/Princeton University Department of Geological and Geophysical Sciences. We are looking for an exceptionally creative individual in the general area of paleontology—stratigraphy—sedimentology for tenure-track appointment as Assistant Professor. Rapid increases in understanding of the processes and history of the earth's surficial environment have come about through analytical and theoretical advances in many specialities, such as magnetic stratigraphy, clay mineralogy and geochemistry, seismic stratigraphy, isotopic and microanalytical studies of fossils and sediments, sedimentation related to crustal tectonics, and mathematical analysis of stratigraphic and paleontological data. We seek candidates with strong interdisciplinary research interests in areas such as those listed, with the analytical skills and foresight to work effectively on the frontier. Within the department, the appointee should be able to take responsibility for an area such as stratigraphy, paleontology, or sedimentology, and provide a broad historical perspective. We plan to back up this appointment by our program for a general expansion of laboratory facilities, as appropriate.

Inquiries should be made to: R. A. Phinney, chairman, at the above address, or by phone, (609) 452-4100. While later applications will be considered, we would like to have them by the 31st of January, 1983, or earlier, if possible. Applicants should submit: resume, names of at least three references, and a statement of research plans and priorities.

Princeton University is an equal opportunity affirmative action employer.

Department Head/Physics and Atmospheric Science, Drexel University. Drexel University seeks an outstanding individual to be Head of the Department of Physics and Atmospheric Science beginning Fall, 1983. Applicants should have extensive research/teaching experience and should have demonstrated appropriate leadership ability. The appointment is non-rotating and the successful applicant will be concurrently a Full Professor with tenure.

Drexel is a private, technological University with an enrollment of 10,000, most of whom participate in a unique cooperative program. It is located in the West Philadelphia Community of University City, in close proximity to two other educational institutions and a major science center. The Department of Physics and Atmospheric Science has 30 faculty, plus an average of five visitors per year, and 40 graduate and 60 undergraduate students. There is significant research activity in three major areas: Experimental Physics (biophysics, nuclear physics, quantum optics, solar energy, solid state physics). Theoretical Physics (atomic and molecular physics, biomathematics, mathematical physics, nonlinear dynamics, nuclear physics, quantum optics, solid state physics) and Atmospheric Science (mesometeorology, remote sensing of the atmosphere and satellite meteorology). Funding for these research activities exceeds one million dollars per year.

Screening of applicants will begin on *March 15, 1983*. Nominations or inquiries should be directed to:

Dr. T. K. Lim, Chairperson
Departmental Head Search Committee
Department of Physics and Atmospheric Science
Drexel University
Philadelphia, PA 19104
(215) 895-2717

DREXEL UNIVERSITY IS AN EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION EMPLOYER

Postdoctoral Positions in Planetary Studies. The Laboratory for Atmospheric and Space Physics at the University of Colorado has openings for two postdoctoral appointments. One appointment will be for study of Voyager observations of planetary rings. The other appointment will be in the field of planetary atmospheres: aeronomy, radiative transfer, and cloud chemistry and microphysics. The Laboratory for Atmospheric and Space Physics is involved with the acquisition, analysis, and understanding of spacecraft observations of solar system objects. Current active missions include Voyager, Pioneer Venus, and Galileo. Applications are invited from graduating students and recent graduates with experience in one or more of the above areas. The term of appointment is for one year with possible renewal on a yearly basis; the starting salary is approximately $1900 per month.

Send letter of application, resume and names of two references by April 15, 1983 to:

Prof. C. A. Barth
Laboratory for Atmospheric and Space Physics
Campus Box 392
University of Colorado
Boulder, CO 80309

The University of Colorado is an equal opportunity/affirmative action employer.

Faculty Positions/The University of Iowa. The Department of Physics and Astronomy anticipates one or two openings for tenure-track assistant professors or visiting professors of any rank in August 1983. Preference will be given to experimentalists in any area for the tenure-track positions. Current research interests include astronomy, atomic, condensed matter, elementary particle, laser, nuclear, plasma, and space physics. The positions involve undergraduate and graduate teaching, guidance of research students, and personal research. Interested persons should send a résumé and a statement of research interests, and have three letters of recommendation sent to *Search Committee, Department of Physics and Astronomy, The University of Iowa, Iowa City, IA 52242.*

The University of Iowa is an equal opportunity/affirmative action employer.

Postdoctoral Fellowships in Experimental Geology or Geophysics/Harvard University. Each year Harvard University offers one or more postdoctoral research fellowships in experimental geology or geophysics. Awards are for one year, normally renewable for a second year; stipends vary depending on the research field and the experience of the candidate, but $20,000 is typical. Interested applicants should send a resume and a statement of proposed research and arrange for at least 2 letters of reference to be sent to the Chairman, Department of Geological Sciences, Harvard University, Cambridge, Massachusetts 02138.

Deadline for the 1983–1984 academic year is April 30, 1983.

Harvard University is an equal opportunity/affirmative action employer.

Position in Petrology/Rice University, Houston, Texas. The Department of Geology has a tenure-track opening beginning July 1983 with starting level of appointment depending on the experience of the candidate. The faculty member is expected to establish, or continue a vigorous research program in petrology and to participate in teaching in mineralogy-petrology. Research areas in which we are potentially interested include: igneous petrology, metamorphic petrology, ore deposition, experimental petrology, interactions of fluids with rocks and sediments, isotope geochemistry, but other specialties are not excluded from consideration. Available research facilities of the Department include: electron-microprobe, ICP-spectrograph, Ar-Ar dating, and stable light isotope mass-spectrometry. Send curriculum vitae, a statement of planned research, and names of at least three references to Dr. A. W. Bally, Chairman, Department of Geology, Rice University, P.O. Box 1892, Houston, Texas 77251.

Rice is an equal opportunity employer.

Assistant or Associate Professor/CSM. The Geology Department of the Colorado School of Mines invites applications for a faculty position commencing September 1, 1983 as Assistant or Associate Professor of Geology in the specialty of Paleontology and Sedimentary Geology to teach courses at the undergraduate and graduate levels, direct theses and conduct research in these areas. The Ph.D. degree is required. Salary is dependent upon experience.

The deadline for applications is April 15, 1983. Resumes and references should be mailed to: Dr. J. J. Finney; Head, Geology Department; Colorado School of Mines; Golden, Colorado 80401.

Colorado School of Mines is an Affirmative Action, Equal Opportunity Employer.

Atmospheric Chemistry & Aeronomy Division (ACAD) and Scientific Computing Division (SCD)/Ph.D. Scientist I or II. The National Center for Atmospheric Research in Boulder, CO is seeking a scientist to establish and manage the scientific research in Incoherent Scatter Radar data base. Will interact with user and radar community to establish research project to insure appropriate scientific use of data base. Position requirements include Ph.D. degree or equivalent, research experience in aeronomy physics, electronic engineering, atmospheric science, or closely related field. Familiarity with the Incoherent Scatter Radar technique for measuring the properties of the ionosphere, magnetosphere, and atmosphere. Demonstrated high level of skills in advanced FORTRAN programming, numerical modeling data reduction techniques. (level III) requires national scientific recognition and demonstrated leadership skills in and promoting Incoherent Scatter Radar research. This is a term position subject to annual review and continued funding for project. Send resume PROMPTLY to Esther Blazon, NCAR, P.O. Box 3000, Boulder, CO 80307 or call 303-494-5151 ext. 581 for information.

NCAR is an equal opportunity/affirmative action employer.

Research Physicists in Ionospheric/Magnetospheric Physics. Two professional level research positions are available in the Physics Department at Boston College. Both require Ph.Ds. A research physicist will have responsibility for analysis of auroral particle data from Air Force Satellites in conjunction with present ongoing research. A background in ionospheric or magnetospheric physics is required. Previous experience with satellite data is preferred. Salary is 20–25K. A senior research physicist will have responsibility for carrying out a high energy particle data analysis program for forthcoming satellites. Extensive knowledge of the radiation belts is required, as is experience in large volume data handling and numerical modeling of high energy particles. Salary is negotiable. Please send resumes to: Prof. R. A. Ulrich, Chairman, Department of Physics/MAGR, Boston College, Chestnut Hill, MA 02167.

Boston College is an affirmative action/equal opportunity employer.

Faculty Position/CSM. The Departments of Geology and Geophysics at Colorado School of Mines anticipate an opening for a joint appointment as Professor of Geology and Geophysics to commence September 1, 1983.

The successful applicant will be expected to teach courses and conduct research integrating exploration geophysics with petroleum geology. Applicant should possess the Ph.D. degree and responsible experience in exploration research and teaching.

A resume and references should be forwarded to Dr. J. J. Finney, Head; Geology Department or to Dr. George V. Keller, Head; Geophysics Department; Colorado School of Mines; Golden, Colorado 80401. Closing date for applications is April 15, 1983.

Colorado School of Mines is an Affirmative Action Equal Opportunity Employer.

AMOCO Foundation Ph.D. Fellowship
Department of Geology University of Missouri-Columbia

The Department of Geology invites applications for the Amoco Foundation Fellowship to support an outstanding Ph.D. Candidate in any subdiscipline of geology. This 3-year fellowship includes a generous stipend, waiver of tuition and fees, and substantial funding to support research. The Department of Geology has dynamic research programs in sedimentology, sedimentary petrology, low temperature geochemistry, tectonics, geophysics, paleontology, and igneous and metamorphic petrology.

For application materials and additional information contact:
Director of Graduate Studies
Department of Geology
University of Missouri-Columbia
Columbia, MO 65211
The deadline for application is March 1, 1983.

Geophysicist/University of Montana. The Geology Department of the University of Montana is inviting applications to fill a tenure track position at the assistant or associate professor level with a specialized area of geophysics beginning Sept. 1983. Teaching and research responsibilities at the undergraduate and graduate levels. Research interests should combine solid earth geophysics and geology.

Applicants must have the Ph.D. degree or expect completion by summer 1983. Those interested should send a letter of application, resume, an outline of teaching and research interests and other relevant material. The applicants should arrange to have at least three letters of recommendation sent to: Arnold J. Silverman, Chairman, Department of Geology, University of Montana, Missoula, MT 59812.

The deadline for applications is March 15, 1983.

The University of Montana is an affirmative action/equal opportunity employer.

The Pennsylvania State University/Faculty Positions. The Department of Geosciences invites applications for three (3) tenure track faculty positions, which are expected to remain open until filled by outstanding geoscientists in any of several fields of specialization. The faculty rank associated with each position is presently open, although salary funds currently available are sufficient for at most one senior full professorship. Salaries, which are competitive, will be commensurate with the experience and qualifications of the appointees. The successful candidates must be, or have demonstrated the potential to become, nationally recognized leaders in their fields. They must also have an interest in teaching and advising graduate and undergraduate students. Persons having an interest in collabora-

THEORETICAL OR EXPERIMENTAL SPACE PLASMA PHYSICISTS

NASA-MARSHALL SPACE FLIGHT CENTER
Huntsville, Alabama 35812

Two positions in theoretical or experimental space plasma physics are available in the Magnetospheric Physics Branch of the Space Science Laboratory at NASA's Marshall Space Flight Center. Either theoretical or experimental backgrounds will be considered with a preference given to theoretically oriented researchers to complement the extensive experimental activities of the branch. The Magnetospheric Physics Branch is involved in the analysis of low-energy plasma data from the ISEE, SCATHA, and Dynamics Explorer satellites, from sounding rockets, and from the Space Shuttle (STS-3). In addition, the group is presently carrying out the joint development of a variety of active space plasma experiments that will be flown on Spacelab One, Two, and Six.

Salaries range from $34,930 to $41,277 per annum, depending on experience.

Interested applicants may contact Dr. Charles R. Chappell at the Marshall Space Flight Center (205-453-3036). Forward resumes to the following address not later than March 1, 1983:

NASA-Marshall Space Flight Center
Space Science Laboratory
Attn: Dr. Charles R. Chappell, ES51-R2
Huntsville, AL 35812

NASA

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tive research with other department faculty are preferred. Instructional and research areas in which particular needs have been identified include, but are not necessarily limited to: *aqueous geochemistry*, with emphasis on low-temperature rock-water (groundwater) interactions; *heavy isotope/trace element geochemistry*, with emphasis on element distribution systematics and their geological applications; *tectonics*, with emphasis on global geophysical and geological processes and observable manifestations of them; *sedimentary geochemistry*, with emphasis on quantitative aspects of carbonate petrology or clay mineralogy; *X-ray mineralogy*, with emphasis on petrological applications of crystallochemical methods; and *modeling* of dynamical earth processes using appropriate physical and mathematical representations.

The selection of persons to fill these three positions will be based in part on the extent to which their future research efforts will complement and further strengthen our programs in Geochemistry and Mineralogy, Geology, and Geophysics. Qualified persons should, therefore, include a brief description of their future research objectives with their résumés and the names of three references, and send to:

C. Wayne Burnham, Head
Department of Geosciences
The Pennsylvania State University
503-B Deike Building
University Park, PA 16802.

The Pennsylvania State University is an affirmative action/equal opportunity employer.

Franklin and Marshall College/Petrologist. We have a 1-year position for the 1983–84 academic year with the possibility that the position may be extended for 1 additional year. The position is full-time involving up to 12 contact hours/semester. Candidates would teach petrology (a one-semester combined igneous and metamorphic course) and either economic geology or a course in their specialty. Candidates would also teach introductory physical geology once a year. Completion of Ph.D. prior to appointment is preferred but not essential.

Franklin and Marshall College has an active geology department which consists of 7 full-time staff members and graduates 25 majors per year. Teaching and research facilities are excellent including an automated XRF vacuum spectrometer. The college is a small (2000 students) four year liberal arts institution.

Candidates should send resume and arrange for 3 letters of reference and transcripts to be sent to:

Dr. Stanley A. Mertzman, Chairman
Department of Geology
Franklin and Marshall College
P.O. Box 3003
Lancaster, PA 17604.

Franklin and Marshall College is an equal opportunity employer.

University of Miami-Rosenstiel School of Marine and Atmospheric Science/Carbonate Geochemist and Environmental Marine Geologist. The Division of Marine Geology and Geophysics has openings for two Research Faculty (non-tenure track). One position will be at the Assistant Professor level and the successful candidate will be responsible for developing research programs in carbonate geochemistry with emphasis on kinetics of diagenetic reactions of natural carbonate materials. One position will be at the Assistant or Associate Professor level and the successful candidate will be responsible for developing research programs in environmental marine geology, appropriate for the sub-tropical setting of South Florida. Successful applicants will be expected to support their salary and research from grants and contracts. Please send curriculum vita and names of three references to:

Dr. C. G. A. Harrison
Division of Marine Geology and Geophysics
Rosenstiel School of Marine and Atmospheric Science
4600 Rickenbacker Causeway
Miami, Florida 33149.

The University of Miami is an equal opportunity/affirmative action employer.

Iowa State University of Science and Technology, Department of Earth Sciences/Faculty Position. Applications are invited for a tenure-track faculty position in mineral resources. Rank is at the assistant or associate professor level, dependent upon qualifications. The successful applicant will be expected to develop a strong research and graduate student program in mineral resources/economic geology and will teach undergraduate and graduate courses in this subject. An applied field orientation is preferred.

Iowa State has established a Mining and Mineral Resources Research Institute in order to support and develop research and education in mineral resources. An interdepartmental graduate minor in Mineral Resources has also been established. In addition to the appointment in the Department of Earth Sciences, there will be full opportunities to interact with these programs.

Completion of the Ph.D. prior to appointment is strongly preferred. In addition, research ability shown by other publications and/or postdoctoral or industrial experience will be an advantage. The position is currently available and is expected to begin no later than September 1983. For application information, please write to:

Bert E. Nordlie, Chairman
Department of Earth Sciences
253 Science I
Iowa State University
Ames, Iowa 50011

Iowa State University is an equal opportunity affirmative action employer.

Postdoctoral Position in Laboratory Astrophysics. The Center for Astrophysics and Space Sciences of the University of California, San Diego is seeking a Postgraduate Research Physicist beginning early 1983. The primary research area will be interstellar dust grains, with emphasis on their formation, mantle growth and composition, and their role in molecule formation. Both laboratory simulation of interstellar conditions and a theoretical approach will be pursued to extend an ongoing experiment on the properties of grain mantle analogs. The applicant should have experience in laboratory practices including infrared spectroscopy, cryogenics and vacuum techniques mass spectroscopy, etc. and also some experience in computing. The research group has a large body of data on IR astronomical spectra and several ongoing observational and theoretical programs in astrophysics which can provide backup information to the dust grain research. Candidates should have completed a Ph.D. in astrophysics or related field before the end of 1982. Salary is in the range $18,192 to $19,848 depending on qualifications and experience. Please send your curriculum vitae, including the names of 3 references, your list of publications, and a brief statement of research interests to Dr. B. Jones, Center for Astrophysics and Space Sciences, C-011, University of California-San Diego, La Jolla, CA 92093 by February 28, 1983.

The University of California is an Equal Opportunity/Affirmative Action Employer.

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Roc Young, Caribu Star Route, Nederland, CO 80466, 303-258-3846.

STUDENT OPPORTUNITIES

Congressional Science Fellowship/AGU. Opportunity for a one-year assignment on the staff of a congressional committee or a House or Senate member as an advisor on a wide range of scientific issues affecting public policy questions.

Individuals who are AGU members and U.S. residents are invited to apply. A broad background in science is expected, as the various duties entailed require the applicant to be articulate, literate, flexible, and able to work well with people from diverse professional backgrounds.

Public policy background is not required although such experience and/or demonstrable interest in applying science to the solution of public problems is desirable.

The fellowship carries with it a stipend of up to $27,000 plus travel allowances.

How to apply:

Candidates should submit a letter of intent, a curriculum vitae, and three letters of recommendation. The letter of intent should include a statement of why the fellowship is desired, how you qualify for it, what issues and congressional situations interest you, what role you envision as a congressional science fellow, and what outcome you hope for in relation to career goals. The individuals from whom you request letters of recommendation should discuss not only your professional competence, but also other aspects of your background that make you particularly qualified to serve as a Congressional Science Fellow.

Send the above to: Department MP, Congressional Science Fellowship Program, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

Application Deadline: March 31, 1983.

Graduate Research Assistantships Available/Department of Meteorology, South Dakota School of Mines and Technology. Several graduate research assistantships are available beginning Fall 1983 in the areas of numerical cloud modelling, cloud physics, weather modification, radiative transfer, radar meteorology, mesometeorology, and air pollution chemistry and physics. Graduate study can lead to a Master of Science degree in Meteorology at SDSM&T as well as a Ph.D. through a cooperative program with Colorado State University. Current areas of research emphasis include: 1) numerical cloud modeling at the single-cloud and mesoscale level, including acid rain formation, 2) design and evaluation of field experiments and operations in weather modification, including hail suppression, 3) aircraft and radar investigations of thunderstorms, 4) radiation and remote sensing from satellites, 5) mesoscale data analysis, and 6) analysis and source apportionment of atmospheric particulate matter. Stipends for the nine-month academic year range from $4,400 to $5,500. Full-time summer employment generally is available. For further information contact Dr. Briant L. Davis, Acting Head, Department of Meteorology, South Dakota School of Mines and Technology, Rapid City, South Dakota 57701-3995 (telephone 605/394-2291).

Graduate Scholarships in Geophysics/University of Wyoming.

Amoco and Chevron Fellowships
M.S. and Ph.D. levels
Up to $10,500/year plus tuition
Research support
Research and Teaching Assistantships
$5,300–7,200/academic year
$2,500 summer stipend
Tuition
Hill Fellowships
Variable stipends

Areas of geophysical research at Wyoming:
Reflection seismology
Gravity and magnetic potential field studies
Physical properties
Paleomagnetism and rock magnetism
Thermal processes
Crustal structure and magnetism
Tectonic modeling
Seismic data processing

Contact: Dr. Kevin P. Furlong
Dept. of Geology/Geophysics
University of Wyoming
PO Box 3006 Univ. Station
Laramie, WY 82071
307/766-4379.

Meetings

Announcements

New Geodesy Session at AGU Spring Meeting

A new Geodesy session entitled Future Trends in Space and Terrestrial Gravity Measurement and Analysis will be featured at the Spring Meeting. This session is designed to promote a discussion of new gravity measuring techniques, including gravity gradients, satellite-to-satellite tracking, and absolute apparatus. The scope of this session includes the presentation of both the instrumentation and the methodology of analysis.

IAGA at IUGG

The International Association of Geomagnetism and Aeronomy (IAGA) will participate in the General Assembly of the International Union of Geodesy and Geophysics (IUGG), to be held in Hamburg, F.R.G., August 15–27, 1983. Specialized symposia for the IAGA meeting were listed in *Eos* (June 8, 1982, pp. 532–533). In addition to those sessions, there will be ample time in general sessions for papers not related to the specialized sessions, according to IAGA President Keith D. Cole. Sessions of general contributions have been scheduled for all subjects in the purview of IAGA, including solid-earth magnetism, upper-atmospheric physics (including aeronomy and ionospheric physics and magnetospheric physics), and related topics for the moon and planets as well as for the interplanetary medium.

Interested participants who do not have the third IUGG bulletin, which includes the registration form, should write to the Local Organizing Committee IUGG 1983, Hamburg Messe und Congress GmbH, Postfach 30 23 60, D-2000 Hamburg 36, F.R.G. The deadline for the receipt of abstracts is March 15, 1983. Please post your original manuscript by air mail to N. Fukushima, secretary general of IAGA, Geophysics Research Laboratory, University of Tokyo, Tokyo 113, Japan. A copy of the manuscript also should be sent to the first convenor of the session for which the presentation is aimed. For additional information, consult the third bulletin or *IAGA News*, No. 21, November 1982.

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS (IUGG)

XVIII GENERAL ASSEMBLY HAMBURG

FEDERAL REPUBLIC OF GERMANY 15–27 AUGUST, 1983

Session Summary and Information on Submission of Abstracts

To receive the Third IUGG Circular, which contains additional information, write to
IUGG 1983
Hamburg Messe und Congress GmbH
P.O. Box 30 23 60
D-2000 Hamburg 36
Federal Republic of Germany
Tel.: (040) 3 56 23 61
Telex: 212 609
Telegram : hamburgmesse

For general information, see *Eos*, June 8, 1982, pp. 532–533.

SUBMISSION OF ABSTRACTS

Closing Dates 1983

IUGG Inter-disciplinary Symposia		
To Convenors		– 15 March
Convenors to Local Organizing Committee [Hamburg]		– 1 May
Association Scientific Meetings		
IAG	To Secretary General, Convenor, President of Section	– 1 March
IASPEI	To Secretary General, Convenor	– 15 March
IAVCEI	To Secretary General, Convenor	– 15 March
IAGA	To Secretary General, Convenor	– 15 March
IAMAP	To Secretary General, Convenor	– 1 March
IAHS	see description of IAHS programme	
IAPSO	To Secretary General, Convenor	– 15 March
ICL	To Secretary General, Convenor	– 1 March

XVIII GENERAL ASSEMBLY

The meetings and symposia at the General Assembly will include:

IUGG
- Plenary and administrative meetings of the Union
- Union lectures
- Inter-disciplinary Symposia
- IUGG Scientific Committee meetings

IUGG ASSOCIATIONS
- Plenary and administrative meetings
- Association symposia
- Meetings of Association Sub-structural groups

INTER-UNION COMMISSIONS
The Inter-Union Commission on the Lithosphere (ICL) will hold scientific and administrative meetings.

INTER-DISCIPLINARY SYMPOSIA
Inter-disciplinary symposia are planned. The Association responsible for each symposium is emphasized and other Associations and Commissions with an interest in the symposium are listed.

IUGG SCIENTIFIC COMMITTEE MEETINGS
Currently not yet scheduled.

UNION LECTURES

Prof. Marcel Nicolet
Réflexions sur l'Année Géophysique Internationale

Prof. J. C. I. Dooge
The Waters of the Earth

Prof. Raymond Hide
Rotating fluids in geophysics and planetary physics

Prof. Rudolf Sigl
Contributions of satellite geodesy to geosciences

Prof. Seiya Uyeda
Subduction zones: their diversity, mechanism and human impacts

INTRA ASSOCIATION SCIENTIFIC MEETINGS
It is expected that most of the Association Commissions, Sub-Commissions, special groups, working groups, etc. mentioned in the IUGG Year Book 1981, will meet at the time of the General Assembly.

IUGG INTER-DISCIPLINARY SYMPOSIA

Title 1 Structures and Processes in Subduction Zones
IAVCEI, IASPEI, ICL

Scope: This Symposium mainly deals with the sedimentary, igneous and mantle structures of subduction zones revealed by seismic and other geophysical-geological techniques as well as the processes of their formation and development from theoretical and observational viewpoints.

Convenor IAVCEI: Prof. K. Kobayashi, Ocean Research Institute, University of Tokyo, 1-15-1 Minamidai, Nakano-ku, Tokyo 164, Japan.

Co-Convener IASPEI: Dr. I. S. Sacks, Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, 5241 Broad Branch Road, NW, Washington DC 20015, USA

ICL-Representative: Prof. K. Kobayashi

Abstracts: should be sent to Prof. K. Kobayashi

Title 2 Lithospheric Deformations
IAG, IAGA, IASPEI, ICL

Scope: This symposium will cover the whole temporal and spatial spectrum of intra- and inter-plate deformations. Hence papers are sought dealing with magnetic, seismic and geodetic evidence for both past and present deformations. Papers dealing with new techniques may also be included.

Convenor IAG: Prof. Kurt Lambeck, Australian Nat. University, Research School of Earth Sciences, P.O. Box 4, Canberra 2600, Australia

Co-Convenors IASPEI: Prof. Zeng Rong-Sheng, Institute of Geophysics, State Seismological Bureau, Beijing, China

IAGA: Prof. M. W. McElhinny, Research School of Earth Sciences, Australian Nat. University, P.O. Box 4, Canberra 2600, Australia

ICL-Representative: Prof. Kurt Lambeck

Abstracts: should be sent to Prof. Kurt Lambeck

Title 3 Crustal Accretion in and around Iceland
IAG, IAVCEI, ICL

Scope: The process of crustal accretion has now been observed in the current rifting episode in Iceland with geodetic, geophysical, volcanological, geochemical, petrological, geological and other methods. Many other studies in and around Iceland are equally relevant to the subject, such as those bearing on the deep geophysical structure, on the tectonic history, on hydrothermal circulation, on equivalent phenomena elsewhere in the world, etc. In conjunction — not independently — all may permit us to assess the dynamic roles of deformation and stress, plate motion, magma generation and ascent, crustal faulting, and other aspects of a more complete model of crustal accretion. Hopefully the symposium will be a forum for a truly, interdisciplinary discussion and exchange.

Convenor IAG: Dr. Sigurdur Steinthorsson, Science Institute, University of Iceland, Geoscience Building, 151 Reykjavik, Iceland

Co-Convenors IAG: Dr. Wolfgang Jacoby, Institut für Meteorologie und Geophysik, Feldbergstr. 47, D-6000 Frankfurt a. M., Fed. Rep. Germany

IAVCEI: Dr. K. Gronvold, Nordic Volcanological Institute, University of Iceland, 101 Reykjavik, Iceland

Abstracts: should be sent either to Dr. Steinthorsson or to Dr. Jacoby

Title 4 Geodetic Features of the Ocean Surface and their Implications
IAG, IAPSO

Scope:
- Marine gravity field
- Satellite altimetry, Sea Surface Topography, Marine Geoid determination
- Altimetry and geophysical interpretation
- Altimetry and physical oceanography
- Status after GEOS3 and SEASAT, dedicated satellite missions
- Global and regional tidal models
- Interaction between tidal models-geoid-gravity
- Marine geoid as a reference surface for geodesy, geophysics and Oceanography
- Mean sea Level, Ocean currents
- Regional problems, requirements
- Interaction between disciplines

Convenor IAG: Prof. Dr. G. Seeber, University Hannover, Institut für Erdmessung, Nienburger Straße 5, D-3000 Hannover 1, Fed. Rep. Germany, Telex 92 38 58 unihnd

Co-Convenor IAPSO: Dr. John Apel, Johns Hopkins University, Johns Hopkins Road, Laurel, Maryland 20815, USA

Abstracts: should be sent to Prof. Seeber

Title 5 Geophysics of the Polar Regions
Bureau, all Associations

Scope: The first and second international polar years and the international geophysical year, 100, 50 and 25 years ago opened the polar regions and the world to coordinated international scientific activity. This Symposium commemorates these endeavors by examining the present state of knowledge of geophysics as applied to the problems and opportunities of polar regions. Papers for this main part of the Symposium are by invitation only.

Convenor IAHS: Dr Mark Meier, Glaciology Water Resources Division, U.S. Geological Survey, 1201 Pacific Ave., Suite 806, Tacoma, Washington, 98402, U.S.A.

Co-Convenors IAG: Prof. O. Möller, Institut für Vermessungskunde, Technische Universität, Pockelsstrasse 4, D-3300 Braunschweig, Fed. Rep. of Germany

IASPEI: Dr. E. S. Husebye, NTNF/NORSAR, P.O. Box 51, N-2007 Kjeller, Norway

IAVCEI: Prof. O. Gonzales-Ferran, Departamento de Geofísica, Universidad de Chile, Casilla 15, Correo Miramonte, Santiago, Chile

IAGA: Prof. M. H. Rees, Geophys. Inst.-Univ. of Alaska, Fairbanks, Alaska 99701, U.S.A.

IAMAP: Prof. M. Kuhn, Inst. Geophysik und Meteorologie, Universität Innsbruck, Schöpfstrasse 41, A-6020 Innsbruck, Austria

IAPSO: Dr. Arnold Gordon, Lamont-Doherty Geological Observatory, Palisades, New York 10964, U.S.A.

Abstracts: There will also be sessions in the second part of the Symposium referring to topics summarized in the following Scope. Abstracts of papers to be contributed to this part of the Symposium should be sent to the IASPEI Co-Convenor Dr. E. S. Husebye.

Scope: At the symposium, the physics of the solid Earth part of it, we shall focus on the tectonic evolution of the polar regions and past and present geodynamic processes. Of particular interest is the passive polar continental margins, the relatively thick basin sediments in the Arctic and the tectonic origin of unusual features like the Alpha-ridge. Tentatively, we envisage several sessions: structures and evolutions of the Arctic and Antarctic regions in general, results and lessons learned from the FRAM IV and similar expeditions and finally the resource potential of the polar regions. Papers on all types of investigations will be considered, and besides those covering topics already mentioned, we would favor those on new geophysical techniques and most recent structural results. Length of presentation should be around 20 minutes.

Title 6 Data Management
IAGA, all other Associations, ICL, CODATA

Scope: Geophysical research depends on large collections of diverse data gathered at many times and places. Reducing these data to common formats, cataloguing, preparing summary displays, archiving and advertisement are parts of the first step in distributing these data to potential users. Convenient methods of access to specified subsets of the data, techniques for editing and reformatting, simple means of display, are parts of the second step. Once the data reach the user, they are analyzed by a variety of techniques, as, for example, time series analysis. The growth of computers, the increasing prevalence of digital data, advances in communications, make it possible to automate these processes of data collection, organization, dissemination and analysis. It is the purpose of this symposium to identify and discuss various techniques which have evolved in the subdisciplines of geophysics to carry out these tasks.

Convenor IAGA: Prof. R. L. McPherron, Inst. of Geophysics and Plan. Phys., Univ. California, Los Angeles, California 90024, USA

Co-Convenors IAG: Prof. Tscherning, Geodaetisk Institut, Gamlehave Allee 22, DK-2920 Charlottenlund, Danemark

IASPEI: Dr. O. Dahlman, Research Inst. for National Defence, FOA 202, S-104 50 Stockholm 80, Sweden

IAVCEI: Dr. F. Chayes, Geophysical Laboratory, Carnegie Institution, 2801 Upton Street NW, Washington DC 20008, USA

Dr. R. Ivanov, Laboratory for Geomathematics and Geodesis, Geological Institute, Ul 38 Block 2, Sofia 13, Bulgaria

IAMAP: Dr. S. Ruttenberg, Nat. Center for Atmospheric Research, P.O. Box 3000, Boulder, Colo. 80307, USA

IAHS: Mr. F. Bultot, Chef Section Hydrologie – IRM, Av. Circulaire 3, B-1180 Bruxelles, Belgique.

IAHS: Dr. Liebscher, Fed. Inst. Hydr., Kaiserin-Augusta-Anlagen 15, D-5400 Koblenz, Fed. Rep. of Germany

IAPSO: Mr. James Crease, Institute of Oceanographic Sciences, Brook Road, Wormley, Godalming, Surrey GU8 5UB, England

ICL: Prof. M. A. Chinnery, National Geophysical Data Center, NOAA/EDIS, 325 Broadway, Boulder, Colorado 80303, USA

Abstracts: should be sent to Prof. R. L. McPherron

Title 7 Hot Spots and Mantle Plumes
IAVCEI, IASPEI

Scope: We request papers on all aspects of intra-plate volcanism — island chains, aseismic ridges, continental alkalic basalts, flood basalts, and diatremes — giving their locations, age relations, physical characteristics, and their chemical and isotopic signatures. We also request papers on the deeper mantle processes which might produce these features and on their implications for mantle-wide evolution.

Convenor IAVCEI: Prof. J. Morgan, Department of Geological and Geophysical Sciences, Princeton University, Princeton, New Jersey 08544, U.S.A.

Co-Convenor IASPEI: Prof. E. R. Kanasewich, Dept. of Physics, University of Alberta, Edmonton, Alberta, T6G 2J1, Canada

Abstracts: should be sent to Prof. Morgan

Title 8 Assessment of Natural Hazards
IASPEI, IAVCEI, IAHS, IAPSO, TSUNAMI C.

Scope:
1. Assessment of hazards from earthquakes
1.1 Statistical methods for determination of regional earthquake risk
1.1.1 From instrumental records
1.1.2 From historical records
1.1.3 From tectonic informations
1.2 Determination of local earthquake risk
1.2.1 Influences of focal parameters
1.2.2 Influences of propagation parameters
1.2.3 Effects related to seismic ground motions as slope movements, changes in hydrological systems

Abstracts: should be sent to the

Convenor IASPEI: Prof. O. Schneider, Institut für Geophysik, Richard-Wagner-Str. 44, D-7000 Stuttgart 1, Fed. Rep. Germany

Scope:
2. Assessment of natural hydrological hazards
2.1 Statistical methods
2.1.1 Estimation of probability of river flooding
2.1.2 Evaluation of flood frequency at a single site
2.1.3 The use of regional records to assess flood frequencies
2.1.4 The precision of estimates of frequency
2.1.5 The combined risk of river and tidal flooding
2.2 The hydrological effects of flooding on agricultural soils
2.3 The assessment of avalanche risk
2.4 Methods of improving flood warning

Abstracts: should be sent to the Convenor Prof. O. Schneider (address see above) with copies to the

Co-Convener IAHS: Dr. J. V. Sutcliffe, Institute of Hydrology, Maclean Building, Crowmarsh Gifford, Wallingford, OX-Oxon OX10 8BB, UK

Scope:
3. Assessment of hazards from tsunamis
3.1 Generation of tsunamis
3.2 Propagation of tsunamis
3.3 Tsunami run-up phenomena
3.4 Case histories
Scientific, engineering and socio-economic questions are to be discussed.

Abstracts: should be sent to Dr. Loomis

Co-Convenors IAPSO: Dr. H. G. Loomis, Ocean Engineering, University of Hawaii, 2540 Dole Street, Honolulu, Hawaii 96822, U.S.A.

IAPSO: Dr. Masashi Miyoshi, Tokyo University of Fisheries, 5-7 Konan 4 Chome, Minato-ku, Tokyo 108, Japan

IAVCEI: Dr. C. Newhall, United States Geological Survey, 5400 MacArthur Blvd. Vancouver, WA 98661, U.S.A

Title 9 Time-Dependent Processes and Properties in Planetary Materials
IASPEI, IAVCEI, ICL

Scope:
- Large-scale rate-dependent geological processes with a view towards physico-chemical microprocesses
- non-equilibrium material properties as they are important e.g. in hydrothermal processes and the rheology of crust and mantle
- reaction kinetics of phase transitions
- time dependent petrological and mineralogical changes
- solid, liquid and gaseous diffusion
- time dependence of physical properties (e.g. elastic transport)
- general time-aspects on various scales: cosmogonic, planetological, geological, recent, at laboratory experiments

Convenor IASPEI: Prof. H. Stiller, Zentralinstitut für Physik der Erde, Telegrafenberg, DDR-1500 Potsdam, German Democratic Republic

Co-Convenors IASPEI: H. Spetzler, Cooperative Institute for Research in Environmental Sciences, Campus Box 449, University Colorado at Boulder, Boulder, Colorado 80309 USA

IAVCEI: Dr. H. Mazursky, United States Geological Survey, Branch of Astrogeological Studies, 2255 North Gemini Drive, Flagstaff, Arizona 86001 USA

ICL: Dr. S. Akimoto, Institute of Solid State Physics, University of Tokyo, Minato-ku, Tokyo 106, Japan

Abstracts: should be sent to Prof. Stiller

Title 10 Heat Flow and Geothermal Processes
IASPEI, IAVCEI, IAHS

Scope: Heat flow as the surface expression of geothermal processes at depth
- regional conductive heat flow patterns
- heat flow anomalies caused by water circulation (local and regional)
- geothermal manifestations of tectonic and magmatic processes

Convenor IASPEI: Prof. Dr. L. Rybach, Institute of Geophysics, ETH-Hoenggerberg, CH-8093 Zurich, SWITZERLAND

Co-Convenors IAVCEI: Dr. J. H. Sass, U.S. Geological Survey, 2255 North Gemini Drive, Flagstaff, Arizona 86001, USA

IAHS: Dr. L. Alföldi, National Water Authority, Fő-u. 44–50, H-1011 Budapest, HUNGARY

Abstracts: should be sent to Prof. Rybach

Title 11 Structure and Composition of the Oceanic Crust
IAVCEI, IASPEI, IAPSO, ICL

Scope: This two-day symposium will consist of invited and unsolicited contributions which relate to the evolution of oceanic crust (age-dependent properties), the formation of new crust (including accreting and transform fault plate-boundary processes) and the nature of the crust in the ocean basins (including intraplate processes).

Convenors IAVCEI: Dr. R. S. Whitmarsh, Institute of Oceanographic Sciences, Wormley, Godalming, Surrey GU8 5UB, UK – telex 858833

Prof. N. Petersen, Institut für Allgemeine und Angewandte Geophysik, Universität München, Theresienstr. 41, D-8000 München 2, Fed. Rep. Germany

Co-Convenors IASPEI: Dr. H. Shimamura, Lab. for Ocean Bottom Seismology, Geophysical Inst. Hokkaido University, Sapporo 060, Japan

IAPSO: Prof. T. D. G. Hilde, Department of Oceanography, Texas A and M College Station, Texas 77843, U.S.A.

ICL: Dr. J. Francheteau, Centre Océanologique de Bretagne, BP 337, 29273 Brest, France

Abstracts: should be sent either to Dr. Whitmarsh or to Prof. Petersen

Title 12 Plateau Uplift, Rifts and Volcanism
IAVCEI, IASPEI, ICL

Scope: The purpose of this symposium is to assess the importance of vertical uplift, rifting and volcanism as expressions of mantle processes. A balance between geologically and geophysically oriented reviews is intended, with emphasis on integrating data from both fields. We especially encourage process-oriented pa-

orientations dealing with the origin, growth, stability and ultimate fate of plateaus and rifts. A comparison of oceanic and continental plateaus will be an additional topic. Within this framework sessions will deal with:
(1) Geodetic, geologic and petrologic aspects;
(2) Geophysical studies (such as seismic, gravimetric, heat flow and magnetic data) of the crust and mantle beneath plateaus and rifts;
(3) Models concerning the origin and evolution of vertical uplift and lateral lithospheric movements and their surface expressions.

Convenor IAVCEI — Prof. H.-U. Schmincke, Institut für Mineralogie, Ruhr Universität Bochum, Postfach 10 21 48, D-4630 Bochum, Fed. Rep. of Germany

Co-Convenor IASPEI — Dr. R. W. Girdler, University of Newcastle upon Tyne, School of Physics, Newcastle-upon-Tyne NE1 7RU, England, U.K.

ICL-Representative — Prof. H.-U. Schmincke

Abstracts — should be sent to Prof. H.-U. Schmincke

Title 13 Scientific Discoveries from MAGSAT Investigations
IAGA, IASPEI, IAVCEI, IAPSO

Scope The complete Magsat data set is now available to all interested investigators from the Space Science Data Center, Code 601, NASA/Goddard Space Flight Center, Greenbelt, MD 20771. Preliminary results of analysis of Magsat data are presented in the April 1982 issue of Geophysical Research Letters.
This session is to provide a forum for presentation both of new results of direct analysis of Magsat data and also of studies closely related in the sense that they confirm Magsat results or lay groundwork for interpretation of Magsat data. Appropriate topics include (1) modeling of the Earth's main magnetic field, (2) studies of motions of core fluid responsible for the main field, (3) identification of crustal anomalies and their interpretation in terms of modeling the crust and, (4) studies of ionospheric and magnetospheric current systems and the resulting currents induced in the Earth.

Convenor IAGA — Dr. Robert A. Langel, Geophysics Branch, Code 922, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA

Co-Convenors IAGA — Dr. Thomas A. Potemra, Applied Physics Laboratory, Johns Hopkins University, Laurel, MD 20810, USA
IASPEI — Professor J. A. Jacobs, Bullard Laboratories, Madingley Rise, Madingley Road, Cambridge, CB3 0EZ, ENGLAND
IAVCEI — Professor I. Yokoyama, Department of Geophysics, Hokkaido University, Sapporo 060, JAPAN
IAPSO — Dr. Donald F. Heinrichs, Oceanographic Division, National Science Foundation, Washington, DC 20550, USA

Abstracts — should be sent to one of the Convenors

Title 14 Interim Results from the Middle Atmosphere Program
IAGA, IAMAP, SCOSTEP

Scope The Middle Atmosphere Program (MAP) is a major international cooperative program under the ICSU Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), for the period of 1982–85, aiming at solving various scientific problems of the middle atmosphere (altitude range 10–110 km) with the aid of modern approaches and tools. Because of a great variety of research and a great number of expected contributions, the paper presentation is so arranged that the symposium consists only of invited talks, and all contributed papers are to be submitted to the Middle Atmosphere Sciences symposium sponsored jointly by IAMAP, IAGA, SCOSTEP and COSPAR. The explanation and session subdivision of the latter symposium are given in the IAMAP part of this IUGG circular.

Convenor IAGA — Prof. L. R. Megill, Center Atmospheric & Space Sciences, Utah State Univ., Logan, Utah 84322, USA

Co-Convenor IAMAP — Dr. R. G. Roper, School of Aerospace Engineering, Georgia Inst. Technology, Atlanta, GA 30332, USA

Abstracts — should be sent to Prof. L. R. Megill

Title 15 Remote Sensing for Climate Studies
IAMAP, IAPSO, IUCRM, URSI, COSPAR

Scope Climate research depends heavily on remote sensing satellites as well as surface-based systems to provide the global data needed for climate diagnostics and climate modeling. The extraction of useful data from current and future monitoring systems will require a new dimension in accuracy and long term consistency. Furthermore the scientific interpretation of the data from remote sensing satellite instruments demand a profound understanding of the physical (and chemical) processes in play at the earth's surface, in the atmosphere and within the sensor.
The symposium will deal with the study of atmospheric, oceanic, cryospheric and land surface properties important for climate research using remote sensing techniques and will give particular emphasis to the scientific interpretation and analysis of remote sensing data for climate research, and to the unique contribution of remotely sensed data to planned climate research programmes.

Convenor IAMAP — Dr. J. E. Harries, Rutherford Appleton Lab., Chilton, GB-Oxon OX11 0QX, Great Britain

Co-Convenors IAPSO — Dr. Catherine Gautier, California Space Institute, UCSD/SIO, A-030, La Jolla, California 92093, USA
IUCRM — Dr. J. Rottger, Max-Planck Inst. Aeronomie, Postfach 20 – Lindau 3, D-3411 Katlenburg, Fed. Rep. Germany
COSPAR — Dr. D. Ohring, Climate and Radiation Branch, NASA/GSFC, Greenbelt, Maryland 20771, USA

Abstracts — should be sent to Dr. J. E. Harries

Title 16 Sea Ice Margins
IAHS, IAPSO, IAMAP

Scope Seasonal and interannual variations of the positions and nature of the sea ice limits; air-ice-ocean interaction processes associated with the sea ice margins, oceanographic and meteorological features and processes associated with sea ice margins; formation and deterioration processes, and characteristic properties of sea ice near the margins, regional studies including the Antarctic sea ice margins and sea ice boundaries on continental shelves; modeling of marginal ice zone dynamics and thermodynamics.

Convenor IAHS — Dr. Robin D. Muench, Senior Research Oceanographer, Science Applications, Inc., 13400 Northup Way, Suite 36, Bellevue, WA 98005, USA

Co-Convenors IAPSO — Dr. Ola Johannessen, Geophysical Institute, University of Bergen, N-5014, Bergen, Norway
IAMAP — Dr. Gunter Weller, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, USA

Abstracts — should be sent to Dr. Muench

Title 17 Low Latitude Coupled Ocean/Atmosphere Circulation
IAPSO, IAMAP

Scope Equatorial upwelling processes; dynamics of monsoon-wind systems, stability of tropical currents; eddies and waves; large scale ocean-atmosphere interaction and climate effects; theoretical aspects of equatorial circulation.

Convenor IAPSO — Dr. David Halpern, NOAA Pacific Marine Environmental Laboratory, 3711 15th Avenue N. E., Seattle, Washington 98105, U.S.A.

Co-Convenors IAPSO — Dr. Henry Rotschi, C.R.S.T.O.M., B.P.A. 5, Noumea, New Caledonia
IAMAP — Dr. C. Frankignoul, Laboratory of Physics and Marine Chemistry, University of Paris, VI, Tour 24–25, 4 Place Jussieu, 75230 Paris, France
Professor B. S. Sarachik, CEPP Pierce Hall, Harvard University, Cambridge, MA 02138 USA

Abstracts — should be sent to Dr. Halpern

Title 18 Ridge Crest Hydrothermal Activity and the Chemistry of Sea Water
IAPSO, IAVCEI, ICL

Scope This symposium will consider the effects of hydrothermal activity at mid-ocean ridges; the chemical composition of sea water and the geochemical cycle of its elements.

Convenor IAPSO — Prof. J. M. Edmond, Department of Earth and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA

Co-Convenors IAVCEI — Dr. G. E. Sigvaldason, Nordic Volcanological Institute, University of Iceland, 101 Reykjavik, Iceland
ICL — Dr. Stephen Scott

ICL-Representative — Prof. J. M. Edmond

Abstracts — should be sent to Prof. J. M. Edmond

Title 19 The Ocean and the CO_2 Climate Response
IAMAP, IAPSO

Scope The interaction between atmospheric CO_2 and the oceans will be examined from a climatological point of view. Questions to be addressed include the variation of atmospheric CO_2 with sea-surface temperature, oceanic sources and sinks of atmospheric CO_2, the uptake of anthropogenic CO_2 by the oceans, and the lagging of atmospheric temperature change by the thermal heat capacity of the oceans. Emphasis will be on models and analyses of data.

Convenor IAMAP — Dr. R. Bacastow, Scripps Institution of Oceanography, University of California at San Diego, P.O. Box 109, La Jolla, CA 92037 U.S.A.

Co-Convenors IAMAP — Dr. L. Merlivat, Department of Physical Chemistry, SACLAY Center for Nuclear Study, 91191 Gif Sur Yvette, Cedex, FRANCE
IAPSO — Professor K. Hasselmann, Max-Planck Institut für Meteorologie, Bundesstraße 55, 2000 Hamburg 13, Fed. Rep. of Germany
Professor Kirk Bryan, Geophysical Fluid Dynamics Laboratory, Princeton University, P.O. Box 308, Princeton, New Jersey 08540, U.S.A.

Abstracts — should be sent to Dr. R. Bacastow

Title 20 Oceanic and Atmospheric Boundary Layers
IAPSO, IAMAP

Scope Consideration of the upper ocean and adjacent atmosphere as an interacting system, with emphasis on time scales of days, rather than months or years; transfer of momentum, heat and mass across the air/sea interface and hence upward (downward) from the boundary into the atmosphere (ocean) interior; surface wave generation by wind.

Convenor IAPSO — Dr. R. T. Pollard, Institute of Oceanographic Sciences, Wormley, Godalming, Surrey GU8 5UB, England

Co-Convenor IAMAP — Dr. P. K. Taylor, same address

Abstracts — should be sent to Dr. Pollard or Dr. Taylor

Title 21 Coastal and Near Shore Zone Processes
IAPSO, IAMAP, IAHS

Scope A. Physical Processes
Consideration of the dynamics and thermodynamics of the coastal and near-shore ocean atmosphere-land system; dynamics of coastal circulation; response to atmospheric forcing; influence of river runoff and topography on circulation, transport and mixing.

Convenor IAPSO — Dr. Paul H. LeBlond, Department of Oceanography, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada

Co-Convenors IAMAP — Dr. Svante Bodin, Swedish Meteorological and Hydrological Institute, Box 923, S-60119, Norrkoping, Sweden
IAHS — Dr. Robert Beardsley, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543, USA

Scope B. Chemical Processes
Attention will be given to the chemical processes occurring in estuaries and in the near shore coastal zone; water chemistry; particulates; sediments.

Convenor IAPSO — Professor T. M. Church, College of Marine Studies, Lewes Complex, University of Delaware, Lewes, Delaware 19958, USA

Co-Convenors IAPSO — Professor B. L. K. Somayajulu, Physical Research Laboratory, Navrangpura, Ahmedabad 380009, India
IAMAP — Dr. Svante Bodin, address see A.
IAHS — Dr. J. C. Duinker, The Netherlands Institute of Sea Research, P.O. Box 59, 1790 AB den Burg, Texel, Netherlands

Abstracts — should be sent to Dr. Paul H. LeBlond (A. Physical Processes), Prof. T. M. Church (B. Chemical Processes)

Submission of IUGG Symposia Abstracts

Abstracts for IUGG Symposia should be prepared and submitted strictly following the instructions given in the ANNEX. These abstracts have to reach the appropriate Convenor before 15 March 1983

INTERNATIONAL ASSOCIATION OF GEODESY (IAG)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IAG leadership
No. 2 Lithospheric Deformations
No. 3 Crustal Accretion in and around Iceland
No. 4 Geodetic Features of the Ocean Surface and their Implications

Symposia in which IAG has an interest
No. 5 Geophysics of the Polar Regions
No. 6 Data Management

IAG SYMPOSIA

In addition to the above Symposia, the International Association of Geodesy will hold specific Symposia selected by the Executive Committee at its meetings in Tokyo, May 1982.

a. "The role of gravimetry in geodynamics"
Topics: The symposium to be held during the General Assembly of IUGG in Hamburg will deal with the various applications of local, regional and global gravity data to geodesy and geophysics in terms of interpretation of the Earth's structure (lithosphere, asthenosphere, etc.), secular and aperiodic variations of the gravity field in connection with subsidence, uplift, etc. of the Earth's surface and related phenomena at low depths as well as gravitational effects associated with global phenomena affecting the system of reference. Pre-, co- and postseismic effects deserve special attention; the possibility of the prediction of earthquakes has to be reconsidered in view of improved gravimetric techniques. Special emphasis has to be put onto combination of gravimetry with geometric techniques such as VLBI, laser satellite techniques. In view of distortion in long-range leveling results the combination of leveling data with gravimetry has to be seen as a technique which should be supplemented by purely geometric space measurements. The quality of gravimetric and geometric observations in dealing with geodynamics is stressed.
Convenor: Prof. Dr. Erwin Groten, Institut für Physikalische Geodäsie, Petersenstrasse 13, Technische Hochschule Darmstadt, Telefon 06151-163109, D-6100 Darmstadt, Fed. Rep. Germany
sections concerned: 3, 5.

b. "Geodynamic aspects of Earth's rotation"
Topics:
– Latest observational results about the short – and long – term variations of the Earth's rotation (polar motion and L.O.D.) including the relations with other geophysical phenomena.
– Theoretical investigations using different Earth's models.
– Effects of the Earth's core.
– Effects of the Earth's atmosphere.
– Tidal friction.
Convenor: Prof. H. Montag, Zentralinstitut für Physik der Erde, 1500 Potsdam, German Democratic Republic
sections concerned: 5, 2, 4

c. "Improved gravity field estimations on a global basis"
Topics:
– Accuracy of terrestrial gravity data on a global basis
– Accuracy of current gravitational models
– Analysis of satellite related data for geopotential improvement.
– Need and prospects for near – and long – term improvements.
– Geophysical aspects of global gravity field models.
Convenor: Prof. R. H. Rapp, Dept. of Geodetic Science and Surveying, Ohio State University, 1958 Neil Ave., Columbus, Ohio 43210, (U S A)
sections concerned: 5, 2, 3, 4

d. "The future of terrestrial and space methods for positioning"
Topics:
– GPS with special emphasis on:
1. accuracy limitations (troposphere, orbital uncertainty, etc);
2. the characteristics of a GPS geodetic field party (number of employees, receivers, types of marks, etc.);
3. integration of DPS/Transit-Doppler data into the classical networks (mathematical models, etc.);
4. optimization techniques applied to GPS/Doppler surveys.
– Inertial surveying with special emphasis on
1. improved processing techniques,
2. integration of inertially obtained data into the classical networks,
3. accuracy limitations of inertial systems,
4. optimization techniques applied to inertial surveying
– Applications of space techniques to vertical networks with special emphasis on
1. utilizing positions determined geometrically from space for controlling vertical networks (requirement for precise geoid);
2. utilizing geometrically determined heights in conjunction with leveling to determine the geoid,
3. the role of space techniques in defining a vertical datum (use of altimetry and 3-G positioning);
4. utilizing space techniques to monitor vertical networks.
Convenor: Capt. J. D. Bossler, National Geodetic Survey, NOS/NOAA, Rockville, Md. 20852, (U S A.)
sections concerned: 1, 2, 4.

e. "Geodetic reference systems"
Topics:
– Definition of and relationship between inertial and terrestrial systems;
– Definition of horizontal and vertical datums and relationship with the terrestrial reference system;
– Geodetic and astronomical constants
Convenor: Dr. G. Lachapelle, Shellech Canada, 425 – 1st Street S.W., Calgary, Alberta, T2P 2H5, Canada. Tel. (403) 232–4321, Telex: SHELTECH CGY 03–827983
sections concerned: 5, 1, 2, 3, 4.

f. "Strategies for solving geodetic problems in developing countries"
Topics:
1. Technical assistance projects – Can they become instrumental in the development of national geodetic agencies?
2. Problems of maintenance of imported geodetic equipment.
3. Research in geodesy. Can developing countries afford it?
4. The possible effects of the lack of adequate height and gravity data on Doppler positions established in developing countries.
Convenor: Dr. A. M. Wassef, 6, Fayoum Street, Heliopolis, Cairo, Egypt.
sections concerned: All

g. "The role of the International Association of Geodesy in meeting the challenges of the future"
Convenor: Prof. H. Moritz, President of IAG, Technical University of Graz, Steyrergasse 17, A-8010 Graz, Austria
sections concerned: All

Submission of Abstracts
Scientists wishing to present a paper in any IAG Symposium should send the original abstract to the Secretary General of IAG, one copy to the convenor of the symposium concerned and one copy to the president of section concerned.
Abstracts should be mailed in sufficient time to arrive no later than 1 March 1983. Abstracts received after the deadline will not be accepted.
Instructions for preparation of IAG abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX.

National Reports
The usual national reports shall be prepared for delivery at the General Assembly (about 100 copies).

Additional Information
Additional information on IAG programmes and activities may be obtained from the Secretary General of IAG.

INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND PHYSICS OF THE EARTHS INTERIOR (IASPEI)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IASPEI leadership
No. 8 Assessment of Natural Hazards
No. 9 Time-Dependent Processes and Properties in Planetary Materials
No. 10 Heat Flow and Geothermal Processes

Symposia in which IASPEI has an interest
No. 1 Structures and Processes in Subduction Zones
No. 2 Lithospheric Deformations
No. 5 Geophysics of the Polar Regions
No. 6 Data Management
No. 7 Hot Spots and Mantle Plumes
No. 11 Structure and Composition of the Oceanic Crust
No. 12 Plateau Uplift, Rifts and Volcanism
No. 13 Scientific Discoveries from MAGSAT Investigations

IASPEI GENERAL ASSEMBLY

IASPEI will hold its 22nd General Assembly in conjunction with the XVIII IUGG General Assembly, 15–27 August 1983, in Hamburg. In addition to participating in Union activities, IASPEI will hold scientific meetings on the topics specified below. IASPEI Commissions will also meet. In addition to the Presidential Address, Association Lectures will be given by Dr. B. L. N. Kennett and Prof. G. J. Wasserburg.
National Correspondents, and others, should note that plenary business sessions are planned for 16 August and 24 August. Among items of business will be election of officers for the ensuing period, and the presentation of accounts, as well as the consideration and adoption of resolutions. Countries are no longer required to present National Reports, but these are welcome if countries wish to prepare them.

IASPEI Scientific Meetings (Dates are still provisional)

1. Palaeogeothermics — 1/2 Day – 25 August
Convenors: Dr. G. Buntebarth, Institute of Geophysics, TU Clausthal, P.O. Box 230, D-3392 Clausthal-Zellerfeld, Fed. Rep. Germany
Prof. L. Stegena, Institute of Geophysics, L. Eötvös-University, Kun Béla tér 2, 1083 Budapest, Hungary
Scope: Contributions should cover aspects of ancient heat flow density within the crust. Emphasis will be on geophysical, geological and geochemical methods which are qualified to estimate temperature gradients during the past.
Reviews and contributed papers will be given on the evolution of the surface temperature and the changes of the thermal regime beneath the crust.

2. Standards in Geothermics — 1/2 Day – 25 August
Convenors: Dr. R. Haenel, Niedersächs. Landesamt f. Bodenforschung, A. Bentz-Haus, Stilleweg 2, P.O. Box 54, D-3000 Hannover, Fed. Rep. of Germany
Dr. V. Cermak, Geophysical Institute, Bocni II, CP 1401, 14131 Praha 4 – Sporilov, Czechoslovakia
Scope: There is an urgent need to standardize measuring and correction procedures as well as representation of data used in geothermics such as temperature, temperature gradient, thermal conductivity, heat flow density, geothermal resources and reserves. Based on already existing preliminary results special topics will be continued. There will be only a limited number of paper presentation; the concrete work of the workshop will be put on discussion to produce further results.

3. Microseisms — 1/2 Day (& commission) – 17 Aug.
Convenors: Prof. J. Darbyshire, Dept. of Physical Oceanography, Marine Science Labs, Menai Bridge, Anglesey, Gwynedd LL59 5EY, North Wales, UK
Prof. A. V. Nikolaev, Inst. of Physics of the Earth, Academy of Sciences of USSR, Bolshaya Gruzinskaya 10, Moscow 123 242, USSR
Scope: The session is involved with the relation between storm waves and microseisms. The discussion will be particularly involved with the structure and directionality of the microseism as exemplified by actual examples recently recorded.

4. Earthquake Algorithms — Poster & 1/2 Day – 24 August
Convenors: Dr. D. J. Doornbos, NTNF/NORSAR, P.O. Box 51, N-2007 Kjeller, Norway
Dr. E. R. Engdahl, Chief, Branch of Global Seismology USGS, Denver Federal Center, Box 25046, Stop 967, Denver, CO 80225, USA
Scope: Improved seismic data and advances in computer technology have made possible dramatic progress in the development of earthquake algorithms. We seek now to better understand optimal methods for estimating all the basic parameters of earthquakes and to present the algorithms in a practical form suitable for routine use. To these ends the IASPEI Sub-Commission on Earthquake Algorithms is organizing a full day meeting to consist of a morning poster session for presentation of a broad range of currently available algorithms and an afternoon workshop for panel discussions on problems of earth structure, earthquake location, and source retrieval.

5. Earthquake Parameters — Poster & 1/2 Day – 26 August
Convenors: Prof. S. J. Duda, Institut für Geophysik, Bundesstrasse 55, D-2000 Hamburg 13, Fed. Rep. of Germany
Dr. J. Vanek, Geophysical Institute, Bocni II, CP 1401, 14131 Praha 4 – Sporilov, Czechoslovakia
Scope: "Earthquake Parameters" is a Symposium and a Poster Session evolving from three Workshops on Quantification of Earthquakes. The Workshops were held as part of the General Assemblies of IASPEI in Durham (1977), Canberra (1979), and London, Ontario (1981). See Special issues on Quantification of Earthquakes, TECTONOPHYSICS vol. 49, No. 3–4, 1978, 119–272, and vol. 84, No. 1, 1982, 1–130.
Progress in instrumental and theoretical seismology offers new possibilities for expressing the earthquake phenomenon by way of physical parameters. In particular, digital broad-band recording of seismic waves is being gradually introduced at many observatories. Also, the dynamic properties of the earthquake focus, as well as the seismicity in general are being described in mathematical models of increasing quality. Many researchers are working on conceptual developments and on applications in practice. Data centers steadily increase the number of earthquake parameters routinely reported.
On this background "Earthquake Parameters" will serve as forum for discussions on the subject. While formal presentations are scheduled for the Symposium, it will be possible to display material and discuss it on an individual basis in the Poster Session. Accents for future research and practice concerning earthquake parameters are expected.

6. Earthquake Prediction: Theory, Physics, and Case Histories — Poster & 1 1/2 Day – 22–23 August
Convenors: Prof. J. R. Rice, Div. of Applied Sciences, Harvard University, Pierce Hall, Oxford Street, Cambridge, Mass. 02138, USA
Prof. K. Shimazaki, Earthquake Research Institute, Yayoi 1-1-1, Bunkyo-ku, Tokyo 113, Japan
Scope: The session emphasizes studies on the earthquake generation process of a kind which may lead to a more fundamental basis for earthquake prediction. Themes of special interest include: 1) Use of geophysical observations (historic records, geodetic, in-situ stress, seismicity patterns, tectonic structure, seismic and electrical properties, pore-fluids, etc.) to develop and/or test hypotheses on the triggering of earthquakes and pre-seismic processes in the source region; 2) Theoretical models of earthquake instability, consistent with or plausibly extrapolated from laboratory studies of deformation, friction and fracture, and inclusive of realistic tectonic settings for crustal deformation processes; 3) Inter-relations between source deformation and the generation of potentially detectable geophysical fields or property alterations; 4) Use of geological and seismological observations on fault behaviour to test hypotheses on the earthquake cycle and recurrence for further improvement of long-term prediction technique. Earthquake case studies of a kind that may contribute to a rational basis for prediction are particularly welcome.

7. Analysis of Strong Earthquake Motions — Poster & 1/2 Day – 26 August
Convenor: Prof. N. N. Ambraseys, Dept. of Civil Engineering, Imperial College of Science & Technology, Imperial Institute Road, London SW7 2BU, England UK
Scope:
– Recent developments of strong-motion instruments.
– Development of processing and interpreting strong-motion records.
– New, near-field strong-motion records of damaging earthquakes.
– Attenuation laws at close distances.

8. Tsunami Wave Propagation — 3/4 Day – 24 August
Convenors: Prof. T. Y. Wu, California Institute of Technology, 104–44, Pasadena, California 91125, USA
Prof. S. L. Soloviev, Institute of Oceanology, Academy of Sciences of the U.S.S.R., 23, Krasikova Street, Moscow, 117218, U.S.S.R.
Results and theory of tsunami wave propagation in the ocean and related seismic waves. Prediction and mitigation of tsunami effects will be included.

9. Quantitative Geodynamics — Poster & 1/2 Day – 18 August
Convenors: Prof. H. J. Neugebauer, Institut für Geophysik, Technische Universität Clausthal, Postfach 230, D-3392 Clausthal, Fed. Rep. Germany
Prof. P. Olson, Earth & Planetary Sciences, Johns Hopkins University, Baltimore MD 21218, USA
Scope: A one day session will be held on the above topic, in order to review recent advances in quantitative studies on processes causing or affecting geodynamic phenomena like: plate movement and structural changes, rifting, orogeny and epirogenic movements.
Contributions should focus on modern developments of mathematical and physical techniques applied to geodynamic phenomena. Attention should also be drawn to the interaction of for instance mechanical, thermal, geochemical parameters and processes.

10. Comprehensive Mapping of the Lithosphere — Poster & 1/2 Day – 18 August (with Commission for Geological Map of the World)
Convenors: Prof. V. V. Belousov, Inst. of Physics of the Earth, Academy of Sciences of USSR, Bolshaya Gruzinskaya 10, Moscow 123 242, USSR
Dr. P. Giese, Institut für Geophysikalische Wissenschaften, Rheinbabenallee 49, 1000 Berlin 33, Fed. Rep. Germany
Scope: The amount of geophysical data describing the lithosphere increases rapidly, and it becomes more and more difficult to collect and compile all these results aiming to elaborate comparing studies showing the main features of the lithosphere in a comprehensive form. It is the task of this half-day symposium which is combined with another half-day poster session to discuss these problems. The convenors ask for contributions demonstrating how to present the different geophysical parameters in comprehensive forms (contour maps, cross sections etc.) which show the main features of the continental and oceanic lithosphere. For this purpose global as well as regional presentation of the thickness, structure, physical parameters, and their lateral variability are of interest. Parameters characterizing the kinematic and dynamic behaviour of the lithosphere are of great importance, too. It is evident, that this task will not be finished with this symposium, but it will and must be started.

11. Structure of the Deep Interior of the Earth — 1/2 Day – 18 August
Convenors: Prof. D. Möller, Institut für Meteorologie u. Geophysik, Feldbergstrasse 47, D-6000 Frankfurt a. M. 1, Fed. Rep. Germany
Dr. V. F. Cormier, M.I.T. Earth Resources Lab., 42 Carleton St., Cambridge, MA 02142, USA
Scope:
– Sharpness of transition zones in the upper mantle
– Structure of the transition between upper and lower mantle
– Structure of the lowermost mantle with special emphasis on the question whether or not there is seismological evidence for a thermal boundary above the core-mantle boundary
– Lateral heterogeneity of the mantle
– Structure of outer and inner core

12. European Geodynamics, Seismicity and Seismic Hazard — 1 Poster – 17 August
Convenors: Dr. A. R. Ritsema, KNMI, Box 201, 3730AE De Bilt, Netherlands
Prof. R. Malaroda, Instituto de Geologia, Via Accademia delle Scienze 5, 10123 Torino, Italy
Scope: Display of European and regional seismicity, of seismo-tectonic and hazard maps, of deep structure of the European lithosphere, and of other materials relevant to the work of the European Seismological Commission

Submission of Abstracts
All Scientists wishing to present a paper in any IASPEI Scientific Meeting should send the original abstract to the Secretary General and a copy to the appropriate Convenor for acceptance. Abstracts should be mailed in sufficient time to arrive not later than 15 March 1983. Instructions for preparation of IASPEI abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX.
All abstracts will be screened by the convenors who will arrange them in sessions and forward them to the Secretary General. Abstracts will be printed by the Local Organizing Committee in a collected abstract volume which will be available to IASPEI registrants in Hamburg.

Additional Information
Persons wishing to present papers either for the IUGG or IASPEI programs and wanting additional information, should contact convenors directly. Information on IASPEI programs and activities may be obtained from the Secretary General of IASPEI.

Meetings of IASPEI Commissions
The following provisional times are scheduled for meetings of IASPEI Commissions.

Commission on Microseisms	17 August (p. m.)
Standard Earth Model Committee	17 August evening
Commission on Earthquake Prediction	18 August evening
Commission on Quantitative Seismology	19 August (p. m.)
Commission on Practice	19 August (a. m.)
International Heat Flow Commission	22 August evening
Commission on Digital Seismology	22 August evening
Commission on Physical Properties of Material of the Earth's Interior	23 August evening
Commission on Strong Motion Seismology	23 August evening

The Commission on Controlled Source Seismology will be arranging a separate Workshop, at Einsiedeln, Switzerland, in the week 5–12 August.
No formal meeting of the European Seismological Commission is planned.

IASPEI Association Lectures
25 August (a. m.)
Prof. G. J. Wasserburg
"Inferences of Mantle Structure and Evolution from Isotopic Geochemistry".
23 August (a. m.)
Dr. B. L. N. Kennett
"Inverse Problems in Perspective".

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTHS INTERIOR (IAVCEI)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IAVCEI leadership
No. 1 Structures and Processes in Subduction Zones
No. 7 Hot Spots and Mantle Plumes
No. 11 Structure and Composition of the Oceanic Crust
No. 12 Plateau Uplift, Rifts and Volcanism

Symposia in which IAVCEI has an interest
No. 3 Crustal Accretion in and around Iceland
No. 5 Geophysics of the Polar Regions
No. 6 Data Management
No. 8 Assessment of Natural Hazards
No. 9 Time-Dependent Processes and Properties in Planetary Materials
No. 10 Heat Flow and Geothermal Processes
No. 13 Scientific Discoveries from MAGSAT Investigations
No. 18 Ridge Crest Hydrothermal Activity and the Chemistry of Sea Water

IAVCEI SYMPOSIA

A. Formation and Evolution of Magma Chambers; Physical and Chemical Processes
Convenor: Dr. Alexander R. McBirney, Center for Volcanology, University of Oregon, Eugene, Oregon 97403, USA
Scope: The symposium will focus on the physical mechanisms of emplacement, cooling, and compositional evolution of sub-volcanic intrusions. Topics to be considered will include theoretical and observational evidence of the effects of heat and mass transfer on the form and composition of plutonic rocks as well as the relationships between volcanism and physical processes in shallow reservoirs.

B. Physical Processes of Magma Eruption (with Emphasis on Large Volcanic Blasts)
Convenor: Dr. R. S. J. Sparks, Research School of Earth Sciences, Australian National University, P.O. Box 4, Canberra A.C.T. 2600, Australia (until 5th Jan. 1983) and thereafter Dept. of Earth Sciences, Cambridge University, Cambridge CB2 3EQ, England
Scope: The aim of this symposium is to consider the physical mechanism of volcanic eruptions including topics such as lava flowage, volcanic plume ascent and generation and emplacement of pyroclastic flows and volcanic blasts. The symposium will deal with theoretical models, field interpretation of the volcanic products and observations from recent volcanic eruptions.

C. Role of Volatiles in Magmatic and Volcanic Processes
Convenors: Dr. F. Le Guern, Centre des Faibles Radioactivités Laboratoire mixte CNRS-CEA, Domaine du CNRS, Place de L'Eglise, 91190 Gif sur Yvette, France
Professor N. I. Khitarov, Vernadsky Institute of Geochemistry Analytical Chemistry, Vorobievskaia Chaussee, Moscow B334, USSR
Scope: Presentation and discussion of new techniques for the sampling, analysis and interpretation of volcanic gases including results of the meeting on Vulcano (September 1982). Role of volatiles in magmatic processes, especially the effect of loss of volatiles on magma differentiation. The role of gases in eruptive dynamics, their influence on the atmosphere, relationship between gas composition and volcanic activity, magma-gas interaction, gas-rock interaction, volcanic gas-atmosphere interaction. Role of volcanic gas transfer in ore deposits and geothermal anomalies

D. Magma Mixing in Volcanic Processes
Convenors: Dr. N. Vatin-Perignon, Institut Dolomieu, LA69 Volcanologie, Pétrologie, Rue Maurice Gignoux, F38031 Grenoble Cedex, France
Professor H. Sigurdsson, Graduate School of Oceanography, Narragansett Bay Campus, University of Rhode Island, Kingston, RI 02881, USA
Dr. M. P. Semet, Laboratoire de Geochimie Comparée et Systematique, Université Pierre et Marie Curie, 4 Place Jussieu, 75230 Paris Cedex 05, France
Scope: The symposium will focus on selected aspects of magma mixing and magma chamber replenishment processes as they bear on eruptive activity. It will cover recent research and/or new concepts in the areas of field geology, petrochemistry, thermodynamics and modelling. Detailed case studies at specific volcanoes may serve as introductory papers.

E. Flood Basalts
Convenors: Dr. K. G. Cox, Department of Geology & Mineralogy, University of Oxford, Oxford OX1 3PR, UK
Dr. K. V. Subbarao, Department of Geology, Indian Institute of Technology, Powai, Bombay 400 076, India
Scope: This symposium will be concerned with all aspects of the geology, geochemistry, rock magnetism and volcanology of continental flood basalt provinces as exemplified by the Deccan Traps, the Karoo, Parana, Antarctic, North Atlantic, Columbia R., Siberian Traps, and similar provinces, though contributions on older formations of comparable nature will be welcome.

Working Group Meetings
Further, a number of Working Group meetings will be organized by IAVCEI. Among others, meetings of the following Working Groups will be scheduled:
Deccan Volcanism
Geothermal Models

Submission of Abstracts
Scientists wishing to present a paper in any IAVCEI Symposium should send the original abstract to the Secretary General and a copy to the first convenor concerned. Abstracts should be mailed in sufficient time to arrive no later than 15 March 1983. Instructions for preparation of IAVCEI abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX.
All abstracts will be screened by the convenors who will arrange them in sessions and forward them to the Secretary General. Abstracts will be printed by the Local Organizing Committee in a collected abstract volume which will be available to IAVCEI registrants in Hamburg.

Additional Information
Additional information on IAVCEI programmes and activities may be obtained from the Secretary General of IAVCEI.

INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY (IAGA)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IAGA leadership
No. 6 Data Management
No. 13 Scientific Discoveries from MAGSAT Investigations
No. 14 Interim Results from the Middle Atmosphere Program

Symposia in which IAGA has an interest
No. 2 Lithospheric Deformations
No. 5 Geophysics of the Polar Regions

IAGA SESSIONS AND MEETINGS

Abbreviation	Title of Session or Meeting (with sponsoring bodies*)
	* Cosponsorship to be confirmed
R1	Reporter Review Session of IAGA Division I on Internal Magnetic Fields
R2	Reporter Review Session of IAGA Division II on Aeronomic Phenomena
R3	Reporter Review Session of IAGA Division III on Magnetospheric Phenomena
R4	Reporter Review Session of IAGA Division IV on Solar Wind and Interplanetary Magnetic Field
RV	Reporter Review Session of IAGA Division V on Observatories, Instruments, Indices and Data
BI	Business Meeting of IAGA Division I
B2	Business Meeting of IAGA Division II
B3	Business Meeting of IAGA Division III
B4	Business Meeting of IAGA Division IV
BV	Business Meeting of IAGA Division V
SA	Business Meeting of IAGA Interdivisional Commission on Antarctic Research
BH	Business Meeting of IAGA Interdivisional Commission on History
BM	Business Meeting of IAGA Interdivisional Commission on the Middle Atmosphere
BE	Business Meeting of IAGA Interdivisional Working Group on Relations between External and Internal Magnetic Variations
I1	Mathematical Modelling of the Geomagnetic Main Field and Secular Variation, and its Applications (WG I–1)
I2	Origin of Main Fields and Secular Changes of the Earth and Planets (WG I–2)
I3	Electromagnetic Studies of the Earth (WG I–3)
I4	The Origin and Significance of Regional Geomagnetic Anomalies (WG I–4)
I5	Megaplates and Microplates (WG I–5)
I6	Paleomagnetism and Dynamo Theory (WG I–8, –2)
I7	Basic Theory and Experiments on the Magnetic Properties of Oxides and Sulphides (WGs I–6, –8)
DI	General Contributions to Division I on Internal Magnetic Fields
2X	Cosmic Dust in Planetary Atmospheres (Div. II; IAMAP, IAU, COSPAR)
2I	Ionospheric Modification (Div. II with URSI*)
2O	Equatorial Ionospheric Irregularities (Div. II)
G2	General Contributions to Division II on Aeronomic Phenomena
PE	Electrodynamics of Polar Atmosphere and Magnetosphere (Divs. II & III with URSI*)
PA	Comparative Study of Planetary Magnetospheres, Ionospheres and Atmospheres (Divs. II & III)
PP	Role of Ionospheric Plasma in the Plasmasphere and Magnetosphere (Divs II & III)
3H	Theory and Modeling of Hydromagnetic Waves (Div. III)
G3	General Contributions to Division III on Magnetospheric Phenomena
4L	Large-Scale Solar-Interplanetary Relations (Div. IV)
4T	Turbulence and Kinetic Physics in the Solar Wind (Div. IV)
4S	Solar Maximum Transition (Div. IV)
4C	Problems Related to Solar-Wind Composition (Div. IV)
G4	General Contributions to Division IV on Solar Wind and Interplanetary Magnetic Field
VW	Workshop on Geomagnetic Observatory and Survey Practice (Div. V)
GV	General Contributions to Division V on Observatories, Instruments, Indices and Data
HE	Historical Events of People (History Comm., IUGG)
HR	The Use of Historical Records in the Study of Geomagnetism and History (History Comm.)
EO	Origin and Comparison of Sq and L Variations (WG E/I)
ES	Separation of the Observed Magnetic Field into Main, Ionospheric and Magnetospheric Contributions (WG E/I)
EI	The External and Internal Magnetic Separation during IMS (WG E/I)
EE	Equatorial Electrojet and Counter Electrojet (WG E/I)
GE	General Contributions on Internal/External Effects (WG E/I)
MAS	Middle Atmosphere Sciences (MA Comm., IAMAP, SCOSTEP, COSPAR)
	Meetings of IAGA Working Groups, and other meetings
I–1	WG I–1 Analysis of the Main Field and Secular Variations
I–2	WG I–2 Theory of Planetary Magnetic Fields and Geomagnetic Secular Variations
I–3	WG I–3 Electromagnetic Induction and Electrical Conductivity (Earth and Moon)
I–4	WG I–4 Magnetic Anomalies (Land and Sea)
I–5	WG I–5 Paleomagnetism
I–6	WG I–6 Rock Magnetism
ED	WG II–A Electrodynamics of the Middle Atmosphere
AO	Joint WG (Divs. II & III) on Auroral Oval and its Extension into Space
III–1	WG III–1 ULF Pulsations
III–2	WG III–2 Composition of Hot Magnetospheric Plasma
III–3	WG III–3 Quantitative Magnetospheric Models
V–1	WG V–1 Geomagnetic Observatories, Instruments and Standards
V–2	WG V–2 Meteor Observatories
V–4	WG V–4 Optical Calibration Standards
V–5	WG V–5 Magnetic Surveys and Charts
V–6	WG V–6 Geophysical Indices
V–7	WG V–7 Collection and Dissemination of Data
V–10	WG V–10 Ground-Based Measurements for Satellite Geomagnetic Surveys
UV	WG (in the Middle Atmosphere Commission) on the Solar UV Irradiance
JWG	Joint Working Groups between IAGA and URSI
	WG on Passive Electromagnetic Probing of the Magnetosphere
	WG on Wave Instabilities in Space Plasmas
DC	Meetings for Strengthening IAGA Sciences in Developing Countries
VRA	Workshop on Venus International Reference Atmosphere (VIRA) arranged by COSPAR and cosponsored by IAGA and IAMAP
CDW	Coordinated Data Analysis Workshop 6 for the IMS (CDAW-6) arranged by SCOSTEP

Short Explanations for IAGA Sessions of the Hamburg Assembly

I1. Mathematical Modelling of the Geomagnetic Main Field and Secular Variation, and its Applications
Convenors: G. R. Barraclough, Geomagnetism Unit, Institute of Geological Sciences, Murchison House, West Mains Road, Edinburgh EH9 3LA, Scotland, U.K.
W. Mundt, Zentralinstitut für Solar-Terrestrische Physik, Heinrich-Hertz-Institut, Rudower Chaussee 5, 1199 Berlin-Adlershof, German Dem. Rep.

As a result of the observations of the geomagnetic field made during the recent Magsat mission, we have an accurate description of the main field at about 1980. If these data are to retain their maximum usefulness for an interval of several years we need accurate estimates of the secular variation; such estimates remain among the main requirements for studies of the Earth's magnetic field.
The aims of this session are: (i) to discuss new developments in methods of modelling the geomagnetic main field and its secular variation and (ii) to examine the resulting models and, in particular, their applications to such topics as the production of global magnetic charts and reference fields and to the study of internal and external field sources. Specific topics of interest include: alternatives to the traditional spherical harmonic analysis; representation of new analyses and their evaluation; reference fields and their uses; estimates of the uncertainties in field models; inductive effects and the separation of the core field; problems of upward and downward continuation; secular variation and secular acceleration and the problems of predicting the future behaviour of the geomagnetic main field on global and regional scales; applications to the study of magnetospheric processes and of motions in the Earth's core; application of Magsat data to the calculation of regional reference fields and charts.

I2. Origin of Main Fields and Secular Changes of the Earth and Planets
Convenor: E. R. Benton, Department of Astro-Geophysics, University of Colorado, Campus Box 391, Boulder, CO 80309, U.S.A.

This session will focus on the fundamental physical mechanisms responsible for the maintenance of the earth's internal magnetic field and its time variations during roughly the past 10,000 years. Reports of recent research on any aspect of this subject are appropriate, but especially welcome will be papers addressing the physical state, thermodynamics or energetics of earth's fluid outer core; the form of both horizontal and vertical fluid motions in it; observations and theory of core-mantle coupling; magnetic westward drift; short-term secular acceleration and jerks; all aspects of archaeomagnetism and historical magnetic records. It is also hoped to include papers dealing with the magnetic fields of the other planets of our solar system.

I3. Electromagnetic Studies of the Earth
Convenors: V. Haak, Institut für Geophysik, Freie Universität Berlin, Rheinbabenallee 49, D-1000 Berlin 33, Fed. Rep. Germany
O. Praus, Geophysical Institute of the Czechoslovakian Academy of Sciences, 141 31 Praha 4 – Sporilov, Czechoslovakia

The session will be concerned with all topics which are related to the experimental and theoretical investigation of electrical structures and properties of the deep interior of the Earth. Of particular interest are studies of the electrical conductivity of lithosphere and asthenosphere in continental and oceanic areas, including active and geothermal zones. Theories for the interpretation and inversion of experimental data will aid in the development of electrical structural models. Investigations of the electrical properties of rocks and minerals under appropriate experimental conditions will contribute to petrophysical and tectonic models of a dynamic Earth.

I4. The Origin and Significance of Regional Geomagnetic Anomalies
Convenors: A. G. Hahn, Bundesanstalt für Geowissenschaften und Rohstoffe, Alfred Bentz Haus, P.O. Box 51 01 53, D-3000 Hannover 51, Federal Republic of Germany

P. J. Hood, Rm. 559, Geological Survey of Canada,
601 Booth St., Ottawa, Ontario, K1A 0E8, Canada

In the past several years the compilation of magnetic anomaly maps has revealed many interesting anomalies of a regional size whose origin lies either in the earth's crust or in the core. The long-wavelength components of these anomalies have also been delineated by satellite magnetometer surveys such as Magsat launched in 1979. The separation of crustal anomalies and those produced by the earth's core is of much current interest. You are invited to submit a paper to the convenors which bears on the elucidation of the origin of these geomagnetic anomalies, particularly with respect to their geological genesis and tectonic significance. A 250-word abstract should be submitted for consideration which summarizes the main procedures, results and conclusions of the study.

I5. Megaplates and Microplates

Convenors: D. S. Stone, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, U.S.A.

A. N. Khramov, Neftianoy Institute VNIGRI, Liteiny I 39, Leningrad G-104, 192104 U.S.S.R.

This session will be focused on the following general areas:

1. Polar-wander curves, reconstruction and paleo-latitudes (geographic and geomagnetic) for cratonic blocks.
2. Recognition, tracking and paleogeographies of microplates, tectonostratigraphic terranes and other non-cratonic areas.
3. The use of paleomagnetic techniques in unravelling the timing of rifting, collision or transform motion on plate boundaries.

In general this session is not looking for papers that are too local in their interest, but is aiming as far as possible at the large scale problems that abound.

I6. Paleomagnetism and Dynamo Theory

Convenors: R. T. Merrill, University of Washington, Oceanography WB 10, Seattle, WA 98195, U.S.A.

D. J. Stevenson, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125, U.S.A.

There has been little cross-fertilization between paleomagnetism and dynamo theory. The purpose of this session is to encourage more interaction and mutual understanding between workers in these fields. The intention is to seek out and define areas in which paleomagnetism may constrain dynamo theory and, conversely, areas in which theoretical considerations may constrain phenomenological modeling of paleomagnetic data. Important topics include: validity of the axial dipole hypothesis, significance and nature of geomagnetic reversals, behavior of transitional fields, variations in reversal rate over geologic time and their implications for core and mantle evolution, multipoles in the paleofield, variations in field strength over periods ranging from 10^{4}–10^{9} years, asymmetries between N and R polarities and their implications for dynamo theory, geomagnetic excursions as indications of magnetic "storms" in the core, and evidence for or against the stochastic nature of the geodynamo.

I7. Basic Theory and Experiments on the Magnetic Properties of Oxides and Sulphides

Convenors: S. K. Banerjee, Dept. of Geology & Geophysics, University of Minnesota, 310 Pillsbury Drive S.E., Minneapolis, MN 55455, U.S.A.

V. Shcherbakov, Geophysical Observatory Borok, Nekouzskiy Region, Yaroslavskaya Oblast, 152 742 U.S.S.R.

It was felt far too often we neglect to report advances or needs for advances in basic theory or experiments dealing with rock magnetism. The purpose of the present session therefore is an unabashed and critical discussion of theories and experiments that form the core of today's rock magnetic knowledge. We would also like to know where we should be going five to ten years from now. Therefore, while we will accept papers dealing with some or other application of "old" rock magnetic knowledge to paleomagnetic problems, we will, however, actively encourage papers dealing with new models, new theories and new observations in grain-size dependent properties and in all types of remanences (TRM, VRM, CRM, DRM). The following is a proposed list of topics.

1. Theoretical and experimental studies about the origin of remanence in pseudo-single domain (PSD) grains.
2. VRM — mechanisms for its origin and stability
3. Comparison of DRM (Depositional Remanent Magnetization) and PDRM (Post-depositional Remanent Magnetization) in soft sediments or sedimentary rocks
4. Controlled studies of CRM (Chemical Remanent Magnetization) in rocks and synthetic samples

DI. General Contributions to Division I on Internal Magnetic Fields

Convenor: D. I. Gough, Institute of Earth and Planetary Physics, University of Alberta, Edmonton, Alberta T6G 2J1, Canada

The purpose of this GI-session is to provide a forum for those papers of high scientific interest in the earth's internal magnetic field but which are not appropriate to any of the special sessions of Division I listed above

2X. Cosmic Dust in Planetary Atmospheres

(cosponsored by IAMAP, IAU and COSPAR)

Convenors: D. E. Brownlee, Department of Astronomy, University of Washington, Seattle, WA 98195, U.S.A.

W. G. Elford, Physics Department, University of Adelaide, Adelaide, S.A. 5001, Australia

This session will cover all aspects of the effects of meteoritic material on planetary atmospheres. Materials input into atmospheres by meteoroids include original solids, vapor and recondensed solids. The meteoroid input comes from both the steady state entry of inter-

these international geophysical studies (the 25th anniversary of the IGY, for example). Papers on the IGY and the International Polar Years (1882–1883; 1932–1933) are particularly sought. Those papers should cover the people, the events, and their influence on modern geophysics. Papers on the contributions of specific countries to those studies would be of great interest. 1983 is also the 100th anniversary of the eruption of Krakatoa. Also, as West Germany is the host country, papers on the Göttingen Magnetic Union, Gauss, and E. Wiechert would be appropriate.

HR. The Use of Historical Records in the Study of Geomagnetism and History

Convenors: H. D. Garrett, Mail Code 144–218, Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91109, U.S.A.

J. Feynman, Boston College, c/o AFGL/PHG, Hanscom AFB, MA 01731, U.S.A.

The dual purpose of the IAGA Interdivisional Commission on History is to foster interest in historical events and in the study and preservation of historical records. This session is intended to promote the latter objective. In this period of financial restraint, many valuable collections of historical records are being lost as the older or financially marginal institutions that have housed these records are closed. It is critical that those data sources come to the attention of the international community so that they may be preserved. Papers on such data sources would be of great value. Specific emphasis of the session will, however, be on the use of historical records in studying long term geophysical phenomena. In the past, papers on auroral and sunspot activity have been common examples. Undoubtably, papers on long term variations in the magnetic fields or tides (both oceanic and atmospheric) would also be of great interest. Finally, papers on specific data bases and on how to preserve data bases are desired.

EQ. Origin and Comparison of Sq and L Variations

Convenors: S. Matsushita, High Altitude Observatory, NCAR, P.O. Box 3000, Boulder, CO 80307, U.S.A.

G. E. Winch, Department of Applied Mathematics, University of Sydney, Sydney, N.S.W. 2006, Australia

J. C. Gupta (Division on Geomagnetism, Earth Physics Branch, Department of EMR, Ottawa K1A 0E4, Canada)

The purpose of this session is to examine external and internal fields of geomagnetic Sq and L variations, to compare similar and different behavior between the two variations, and to discuss their formation mechanisms. Detailed data analyses of various tidal terms, global investigations of morphological behavior of Sq and L (such as day-to-day, seasonal, solar-cycle, secular, geomagnetic-activity, and latitudinal variations), discussions of ocean and ground induction effects, and estimations of induction source fields are desirable. The formation and propagation of tidal winds in the upper atmosphere and the three-dimensional wind dynamo, as well as the effects of solar winds, magnetosphere, and field-aligned currents, need to be taken into account. In other words, this session will provide a better understanding of electromagnetic interactions from the interplanetary space through the earth's interior for Sq and L.

ES. Separation of the Observed Magnetic Field into Main, Ionospheric and Magnetospheric Contributions

Convenors: W. P. Olson, Space Sciences Department, McDonnell Douglas Astronautics Company, 5301 Bolsa Ave., Huntington Beach, CA 92647, U.S.A.

S. Matsushita, High Altitude Observatory, NCAR, P.O. Box 3000, Boulder, CO 80307, U.S.A.

B. P. Singh, Indian Institute of Geomagnetism, Colaba-Bombay 400 005, India

The source currents for the magnetic field observed at the earth's surface are known to flow in the earth's core, the ionosphere and the magnetosphere. In addition, because of the finite electrical conductivity of the earth's crust, currents flow near the surface of the earth in response to the ionospheric and magnetospheric source currents. It is desirable to separate the observed surface magnetic field into main, ionospheric, and magnetospheric components. An accurate description of the main field permits the precise location of crustal magnetic anomalies. Both the ionospheric and magnetospheric physics communities are concerned with better quantitative descriptions of the sources and dynamics of the current systems that persist in each region. To identify accurately the sources and behavior of the solar quiet daily variation field at the earth's surface (Sq), it is necessary to determine not only the day-to-night variation but also the baseline of this field contribution. Papers submitted to this session should discuss these problems in a quantitative manner. An attempt will be made to formulate a quantitative statement concerning both the variability and the magnitudes of these sources of the earth's surface magnetic field.

EI. The External and Internal Magnetic Field Separation during IMS

Convenors: W. H. Campbell, Branch of Electromagnetism and Geomagnetism, U.S. Coast and Geodetic Survey, Box 25046, M.S. 964, Denver Federal Center, Denver, CO 80225, U.S.A.

K.-K. Tschu, Institute of Geophysics, Academia Sinica, P.O. Box 928, Peking, China

This session will concern the separation of global geomagnetic field measurements into parts of external and internal origin. The focus of the session will be upon geomagnetic records gathered during the IMS period. Techniques of analysis, selection and preparation of records for study, and application of the separated fields to such topics as earth conductivity and ionospheric/magnetospheric processes will be included.

EE. Equatorial Electrojet and Counter Electrojet

Convenors: R. D. Rastogi, Indian Institute of Geomagnetism, Colaba, Bombay 400 005, India

E. Oni, Department of Physics, University of Ibadan, Ibadan, Nigeria

An eastward or westward electric field over the equatorial ionosphere is known to generate the normal equatorial electrojet or counter electrojet currents respectively during the daytime. Both these currents have profound effects on the low latitude ionospheric plasma distributions and on the plasma irregularities. Abnormal reversals of electric fields in the nighttime do not generate currents but do generate irregularities in the F region designated as spread F.

The present session would deal with the general features of equatorial electrojet and counter electrojet phenomena based on ground, rocket and satellite measurements as well as on their association with ionospheric phenomena at low and tropical latitudes.

Papers are also invited on outstanding problems of these electrojet currents like their latitudinal and vertical extents, path of these current systems, association with general Sq current system, association with interplanetary magnetic field and solar wind parameters. The generation of these current systems is very important and contributions would be encouraged on theoretical aspects of electrojets. Coupling between equatorial and auroral electrojets would be another important aspect to be discussed.

GE. General Contributions on Internal/External Effects

Convenor: S. R. C. Malin, National Maritime Museum, London SE10 9NF, U.K.

At previous meetings many papers have been submitted that do not fit into the preordained mould. Since (in the convenor's opinion) the main justification for IAGA is that it provides an international forum at which geophysicists can present and discuss their current work, it is important that the programme should contain a few 'dustbin' sessions for all the misfits. This is the major thrust of this session.

Providing the science is sound and they are not more appropriate to other sessions, we will welcome all papers that relate to internal/external aspects of magnetic variations, Sq, L, or models of the magnetic field between the surface of the core and the magnetosphere. (The External/Internal Working group is itself something of a dustbin.)

Joint IAMAP/IAGA Symposium on Middle Atmosphere Sciences (MAS)

This symposium is jointly organized by the IAMAP Commission on Meteorology of the Upper Atmosphere (ICMUA) and IAGA. Cosponsoring groups are the International Commissions on Atmospheric Chemistry and Global Pollution (ICACGP), Atmospheric Electricity (ICAE), Dynamic Meteorology (ICDM), Ozone (IOC), and Radiation (IRC). COSPAR and SCOSTEP also cosponsor this symposium.

Note that there is a separate IUGG Symposium No. 14 "Interim Results from the Middle Atmosphere Program" with review papers.

Convenors: A. Ebel, Institute for Geophysics and Meteorology, University of Cologne, D-5000 Köln 41, F.R. Germany

P. C. Simon, Institut d'Aeronomie Spatiale de Belgique, 3, Avenue Circulaire, B-1180 Bruxelles, Belgique

The emphasis of the program will be on the dynamics, energetics and chemistry of the middle atmosphere (about 10 to 120 km height). Special problems included are the electrodynamics of the middle atmosphere and the physics and chemistry of ions, aerosols and noctilucent clouds. Mutual interactions of the middle atmosphere regions and coupling with the troposphere and upper mesosphere will be discussed. Sessions on remote sensing, climatology, modeling and transport processes are planned. Mainly contributed and some invited papers will be included.

Other Meetings which welcome IAGA Participants

Workshop on Venus International Reference Atmosphere (VIRA) arranged by COSPAR and cosponsored by IAGA and IAMAP

Subject: To include discussion of chemical composition below homopause, structure below 100 km, neutral upper atmosphere structure, ionosphere and solar wind interaction, solar and thermal radiation, particulate medium in atmosphere. The aim is the eventual publication of the Reference Atmosphere.

Organizers: G. M. Keating, NASA Langley Research Center, Hampton, VA 23665, U.S.A.

V. I. Moroz, Sternberg Astronomical Institute, Moscow, U.S.S.R.

A. J. Kliore, Jet Propulsion Laboratory, Pasadena, CA 91103, U.S.A.

Coordinated Data Analysis Workshop 6 (CDAW-6) arranged by SCOSTEP. Information is available from:

R. H. Manka, Associateship Office, National Research Council, 2101 Constitution Avenue, Washington, D.C. 20418, U.S.A.

Submission of Abstracts

All scientists wishing to present a paper in any IAGA Session should send the original abstract to the Secretary General of IAGA, and a copy to the first Convenor of the session concerned. The deadline for the submission of IAGA abstracts is 15 March 1983.

The deadline for the submission of Joint IAMAP/IAGA Symposium (MAS) abstracts is 1 March 1983.

The format for IAGA papers is the same as that for IUGG papers, which is given in the ANNEX. However, the typing instructions are slightly different. Detailed instructions will be given in the next issue of IAGA News. Abstracts will be printed by the Local Organizing Committee in a collected IAGA abstract volume which will be available to IAGA registrants in Hamburg.

Additional Information

Information on IAGA programmes and activities may be obtained from the Secretary General of IAGA.

INTERNATIONAL ASSOCIATION OF METEOROLOGY AND ATMOSPHERIC PHYSICS (IAMAP)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IAMAP leadership

- No. 15 Remote Sensing for Climate Studies
- No. 19 The Ocean and the CO_2 Climate Response

Symposia in which IAMAP has an interest

- No. 5 Geophysics of the Polar Regions
- No. 6 Data Management
- No. 14 Interim Results from the Middle Atmosphere Program
- No. 16 Sea Ice Margins
- No. 17 Low Latitude Coupled Ocean/Atmosphere Circulation
- No. 20 Oceanic and Atmospheric Boundary Layers
- No. 21 Coastal and Near Shore Zone Processes

IAMAP SCIENTIFIC SESSIONS

The following information on IAMAP Symposia has been extracted from IAMAP First Circular, published by the Secretary General.

IAMAP Symposia

ACGP-1 THE APPLICATION OF STABLE ISOTOPES TO PROBLEMS OF THE ATMOSPHERE, CRYOSPHERE AND OCEAN

This symposium is being organized by the IAMAP Commissions on Atmospheric Chemistry and Global Pollution (ICACGP) and Climate (ICCL).

Description: The symposium will deal with the following:

1) ^{13}C and ^{18}O in marine sediments to investigate past ocean circulation and paleoclimates;
2) Study of ^{2}H and ^{18}O fractionation processes in the course of the water cycle, application to climatology and paleoclimatology;
3) Analysis of isotope records from ice sheets, comparison with oceanic records;
4) Use of other stable isotopes (^{13}C, ^{15}N, ^{34}S . . . .) to investigate oceanic and atmospheric processes.

Sessions: Three sessions are planned over a one day period.

Convenors: Dr. D. Ehhalt, Institute for Chemistry, Postfach 1913, D-517d Jülich, FEDERAL REPUBLIC OF GERMANY

Dr. L. Merlivat, Department of Physical Chemistry, SACLAY Center for Nuclear Study, 91191 Gif Sur Yvette, Cedex, FRANCE.

AE-1 THUNDERSTORMS, STRONG CONVECTION, AND LIGHTNING

This symposium is being organized by the IAMAP Commission on Atmospheric Electricity (ICAE) and cosponsored by the Commission on Cloud Physics (ICCP).

Description: This symposium is concerned with all aspects of the dynamics, the microphysics, and the electrification of large storms culminating in lightning.

Sessions: Two sessions over a one day period.

Convenor: Professor J. Latham, University of Manchester, P. O. Box 88, Manchester M60 1QD, UNITED KINGDOM

CL-1 SMALL-SCALE CLIMATE PROCESSES

This symposium is being organized by the IAMAP Commission on Climate (ICCL)

Description: Development of built-up area in cities, deforestation or afforestation, change from grassland to field, change from desert to irrigated land, etc., have been causing striking effects on distribution of climate in a local or micro-scale. Our knowledge about the effects of complex terrain, such as estimation of the roughness parameter of complex terrain, and models of nocturnal downslope wind, cold air lake and thermal belt of complex terrain, is incomplete. The objective of the symposium is therefore to evaluate quantitatively their effects or to illustrate models in the tropics as well as in the middle and high latitude regions and to understand the physical processes which govern them. Topics will be:

(1) effects of changes in the earth's surface, such as urbanization, industrialization, deforestation, afforestation and artificial lake;
(2) effects of complex terrain, such as on the roughness parameter and on the model of nocturnal cold air drainage, cold air lake and thermal belt;
(3) interrelationship between the small-scale and the meso- or synoptic scale climate phenomena.

Sessions: Three to four sessions are planned over a one and a half day period.

Convenor: Professor M. M. Yoshino, Institute of Geoscience, University of Tsukuba, Ibaraki 305, JAPAN.

DM-1 PRELIMINARY SCIENTIFIC RESULTS OF ALPEX

This symposium is being organized by the IAMAP Commission on Dynamic Meteorology (ICDM) and is cosponsored by the Radiation Commission (IRC).

Description: The purpose of this session is to emphasize early results obtained using data from the 1981–82 field phase of ALPEX. Papers are invited dealing with representation of the effects of orography in numerical models, as well as characteristics of the air flow over and around the Alpine complex; Alpine lee cyclogenesis; drag, vertical momentum transport and wave energy dissipation; Alpine local winds; sensible and latent heat flux over the Mediterranean Sea; differential radiative heating introduced by the Alpine range; its effect on precipitation; and severe weather phenomena of the region.

Sessions: Two sessions are planned over a one day period.

Convenors: Professor W. Blumen, Campus Box 391, University of Colorado, Boulder, CO 80309, USA

Professor F. Mesinger, Department of Meteorology, University of Belgrade, P. O. Box 550, 11001 Beograd, YUGOSLAVIA.

GM-2 BLOCKING AND ATMOSPHERIC PREDICTION

This symposium is being organized by the IAMAP Commission on Dynamic Meteorology (ICDM).

Description: Topics will include characteristics of blocking; mechanisms for the initiation, maintenance and breakdown of blocking; prediction of blocking; impact of blocking on the predictability of large-scale motions.

Sessions: Two sessions are planned over a one day period.

Convenor: Dr. J. Egger, Meteorological Institute, University of Munich, Theresienstraße 37, G-8000 Munich 2, FEDERAL REPUBLIC OF GERMANY.

GM-3 PREDICTABILITY OF MESOSCALE PHENOMENA

This symposium is being organized by the IAMAP Commission on Dynamic Meteorology (ICDM).

Description: The recent emphasis on improving mesoscale forecasts, in particular quantitative precipitation, has raised the questions of: What mechanisms control the predictability of mesoscale phenomena and over what time interval can these events be predicted? The focus of these sessions will be centered on two main topics:

(1) empirical determination of limits of predictability of mesoscale phenomena;
(2) theoretical determination of limits of predictability of mesoscale phenomena.

One day will be devoted to each topic. The distinction here between empirical and theoretical experiments will be understood to be studies which use either real or idealized data for their conclusions. Note that in each session analytical, numerical, or experimental studies will be classified in one of the two topics by whether they use real or idealized data.

Sessions: Four sessions are planned over a two day period.

Convenor: Dr. I. Orlanski, NOAA/GFDL, Princeton University, Princeton, NJ 08540 USA.

MUA-2 WORKSHOP on the TIDES IN THE MESOSPHERE AND LOWER THERMOSPHERE

This Workshop is being organized by the IAMAP Commission on Meteorology of the Upper Atmosphere (ICMUA) Working Group of the same title.

Session: Planned for a one day period.

Convenor: Professor J. Forbes, Department of Physics, Boston College, Chestnut Hill, MA 02167 USA.

PAE-1 RECENT ADVANCES IN PLANETARY METEOROLOGY — A MEMORIUM TO SEYMOUR L. HESS

This symposium is being organized by the IAMAP Commission on Planetary Atmospheres and their Evolution (ICPAE) and cosponsored by the Commissions on Dynamic Meteorology (ICDM), Radiation (IRC), and possibly the Commission on Atmospheric Chemistry and Global Pollution (ICACGP).

Description: During the past two years there have been important observations of several planetary atmospheres in sufficient detail that enabled quantitative comparison with terrestrial phenomena. In this symposium we propose a detailed intercomparison of the phenomena found in the atmospheres of Venus, Mars, Jupiter, Saturn, and Titan. In particular, relations to their dynamical properties, radiative and cloud properties, and their chemical composition will be highlighted. The discussions will be arranged in order to relate our expanding knowledge of these planetary atmospheres with more familiar processes known in the terrestrial environment.

Sessions: Three sessions are planned over a one and a half-day period.

Convenor: Professor G. E. Hunt, Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT, UNITED KINGDOM

R-1 INTERDEPENDENCE OF CLOUDS, TRACE SUBSTANCES, RADIATION, AND CLIMATE

This symposium is being organized by the IAMAP Commissions on Climate (ICCL) and Radiation (IRC). It is being cosponsored by the Commissions on Atmospheric Chemistry and Global Pollution (ICACGP), Cloud Physics (ICCP), Dynamic Meteorology (ICDM), and Polar Meteorology (ICPM); and also by the WMO/ICSU Joint Scientific Committee for the World Climate Research Program.

Description: Emphasis will be on two closely related aspects of the subject:

(1) Determinations of the radiative properties of cloud fields, observations of large-scale cloud systems, the effects of cloudiness on the earth's radiation budget, and parameterization of the effects of clouds in general circulation models;
(2) determinations of the response of climate to changes of various external and internal elements of the climate system, including treatment of radiation and feedback mechanisms in climate models.

Sessions: Eight sessions are planned over a four day period.

General Convenor: Dr. W. W. Kellogg, NCAR, P. O. Box 3000, Boulder, CO 80307, USA

Co-Convenors: Professor E. Raschke, Institute for Geophysics and Meteorology, University of Köln, Kerpener Strasse 13, D-5000 Köln 41, FEDERAL REPUBLIC OF GERMANY,

Dr. V. Ramanathan, NCAR, P. O. Box 3000, Boulder, CO 80307, USA

Joint Symposia

MUA-1 JOINT IAGA/IAMAP SYMPOSIUM ON MIDDLE ATMOSPHERE SCIENCES (MAS)

This Symposium is being jointly organized by the International Association of Geomagnetism and Aeronomy (IAGA) and by the IAMAP Commission on Meteorology of the Upper Atmosphere (ICMUA). Cosponsoring groups are the International Commissions on Atmospheric Chemistry and Global Pollution (ICACGP), Atmospheric Electricity (ICAE), Dynamic Meteorology (ICDM), Ozone (IOC), and Radiation (IRC).

Description: The emphasis of the program will be on the dynamics, energetics and chemistry of the middle atmosphere (about 10 km to 120 km height). Special problems included are the electrodynamics of the middle atmosphere and the physics and chemistry of ions, aerosols and noctilucent clouds. Mutual interactions of the middle atmosphere regions and coupling with the troposphere and upper mesosphere will be discussed. Sessions on remote sensing, climatology, modeling and transport processes are planned. Mainly contributed and some invited papers will be included. There will be a separate IUGG symposium with review papers on "Interim Results from the Middle Atmosphere Program".

Sessions: Eleven sessions are planned for this symposium over a five day period

Convenors: Dr. A. Ebel, Institute for Geophysics and Meteorology, University of Köln, 5000 Köln 41, FEDERAL REPUBLIC OF GERMANY

Dr. P. C. Simon, Belgium Institute of Aeronomy, 3 Avenue Circulaire, B-1180 Brussels, BELGIUM

PM-1 POLAR METEOROLOGY AND CLIMATOLOGY

This symposium is being jointly organized by the Scientific Committee on Antarctic Research (SCAR) and the IAMAP Commission on Polar Meteorology (ICPM). It is being cosponsored by the IAMAP Commission on Climate (ICCL).

Description: Papers on the aspects of polar meteorology and climatology and the role of the polar regions in the global systems are acceptable, including GCM and climate models, ocean-ice-atmosphere interaction, radiation and energy balance, trace constituents in the polar regions, remote sensing, and synoptic and local phenomena and processes.

Sessions: Four sessions are planned over a two day period.

Convenors: Professor G. Weller, Geophysical Institute, University of Alaska, Fairbanks, AK 99071, USA

Professor M. Kuhn, Institute for Meteorology and Geophysics, University of Innsbruck, Schöpfstrasse 41, A-6020 Innsbruck, AUSTRIA

PM-2 ATMOSPHERIC ICE CRYSTALS AND HAZE IN POLAR REGIONS

This symposium is being jointly organized by the International Association of Hydrological Sciences (IAHS) and the IAMAP Commission on Polar Meteorology (ICPM). It is cosponsored by the IAMAP Commissions on Atmospheric Chemistry and Global Pollution (ICACGP) and Cloud Physics (ICCP).

Description: This symposium will deal with all aspects of ice crystal and haze in the polar atmosphere: meteorological processes, physical processes, chemical composition, optical properties, electrical properties, temporal and spatial distribution of precipitation, trajectories of haze, and transport of ice crystals during and after precipitation.

Sessions: Two sessions are planned over a one day period.

Convenor: Professor M. Kuhn, Institute for Meteorology and Geophysics, University of Innsbruck, Schöpfstrasse 41, A-6020 Innsbruck, AUSTRIA

Submission of Abstracts

All scientists wishing to present a paper in any Joint or IAMAP Symposium should send the original abstract to the Secretary General and a copy to the appropriate Convenors for acceptance. Abstracts should be mailed in sufficient time to arrive not later than 1 March 1983. Instructions for preparation of IAMAP abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX.

Abstracts will be printed by the Local Organizing Committee in a IAMAP abstract volume, which will be available to IAMAP registrants in Hamburg.

Additional Information

Information on IAMAP programs and activities may be obtained from the Secretary General of IAMAP.

INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES (IAHS)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposium under IAHS leadership

- No. 16 Sea Ice Margins

Symposia in which IAHS has an interest

- No. 5 Geophysics of the Polar Regions
- No. 6 Data Management
- No. 8 Assessment of Natural Hazards
- No. 10 Heat Flow and Geothermal Processes
- No. 21 Coastal and Near Shore Zone Processes

IAHS GENERAL ASSEMBLY

The International Association of Hydrological Sciences General Assembly will be held concurrently with those of other IUGG Associations in Hamburg, Germany, 15–27 August 1983. The following is a listing of IAHS symposia and other matters pertaining to the IAHS Assembly.

Business Meetings

The Association and its Commissions and Committees are expected to meet in plenary sessions during the Assembly as are the Bureaux of these bodies. IAHS plans to hold its first plenary session on the afternoon of Monday, 15 August; its second plenary session on the evening of Friday, 19 August, and its third plenary session on the afternoon of Friday, 26 August 1983, at which times the presidential address, reports of Commissions, election of officers, adoption of resolutions and other matters will be taken up. An agenda of these meetings will be sent to all National Correspondents.

Submission of Abstracts

Any scientist wishing to present a paper to any IAHS symposium should send a copy of his/her abstract to

Dr. H.-J. Liebscher
Federal Institute of Hydrology
Kaiserin-Augusta-Anlagen 15
D-5400 Koblenz
Federal Republic of Germany

After arrival, the abstracts will be sent immediately to the appropriate convenor.

The papers of all IAHS symposia will be published as volumes of Proceedings in the IAHS series. The volumes of the symposia on "Hydrology of Humid Tropical Regions with particular Reference to the Hydrological Effects of Agriculture and Forestry Practice" and on "Dissolved Loads of Rivers and Surface Water Quantity/Quality Relationships" will be prepublished; those for "Hydrological Applications of Remote Sensing and Remote Data Transmission", "Relation of Groundwater Quantity and Quality" and "Scientific Procedures applied to the Planning and Management of Water Resource Systems" will be published after the end of the Assembly.

The cost of each volume will be DM 85,— (£ 20) if bought in Hamburg. The price of these proceedings will be increased after the assembly to £ 25. The participants are required to buy one of the volumes. Participants who have already paid for the proceedings published after the assembly will receive the volume immediately after printing.

The deadline for receipt of abstracts is 31 October 1982. The deadline for receipt of full texts of papers for those symposia for which papers will be prepublished, is 31 January 1983. Instructions for preparation of IAHS abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX.

All abstracts will be screened by the symposia convenors who will arrange them in sessions and forward them to Dr. Liebscher before 1 March 1983. Abstracts will be printed by the Local Organizing Committee in a collected abstract volume which will be available to IAHS registrants in Hamburg.

Travel Funds

A small amount of money to cover partial travel expenses may be available. Delegates from developing countries, key invited speakers, and young scientists will receive priority consideration.

National Reports

IAHS will welcome National Reports and will distribute them to delegates during the course of the Assembly. It is estimated that 400 copies of each report will be needed.

IAHS Social Programme

There will probably be an IAHS reception in the first week and an IAHS dinner in the second week. Probably a tennis tournament will be held.

Additional Information

Information on IAHS programmes and activities may be obtained from

Dr. J. Rodda
Secretary General of IAHS
Institute of Hydrology
Crowmarsh Gifford
Wallingford, Oxon
OX10 8BB, United Kingdom.

IAHS Symposia

HS1 HYDROLOGICAL APPLICATIONS OF REMOTE SENSING AND REMOTE DATA TRANSMISSION (ICRSDT) (cosponsored by WMO and UNESCO)

18–25 August 1983

Convenor: A. I. Johnson, Woodward-Clyde Consultants, Harlequin Plaza-North, 7600 East Orchard Road, Englewood, Colorado 80111, USA

Co-Convenor: F. Gunneberg, Bundesanstalt für Gewässerkunde, Kaiserin-Augusta-Anlagen 15–17, 5400 Koblenz, Federal Republic of Germany

Papers on research, operational procedures, and training related to remote sensing and remote data transmission in the general field of hydrology and water resources, such as precipitation, snow and ice, surface water, soil moisture, water quality, groundwater, coastal and wet lands hydrology, water use, planning, and management.

HS 2 RELATION OF GROUNDWATER QUANTITY AND QUALITY (ICGW/ICWQ) (cosponsored by UNESCO)

24–26 August 1983

Convenor: F. Dunin, CSIRO Division of Plant Industry, P.O. Box 1600, Canberra City, ACT 2601, Australia

Co-Convenor: D. Matthess, Geologisch-Paläontologisches Institut, Christian-Albrechts-Universität, Olshausenstraße 40/60, 2300 Kiel, Federal Republic of Germany

(1) Effects of quantitative human activities on groundwater quality (irrigation, recycling of thermally and chemically polluted water, extraction of groundwater, draining activities, and mining).
(2) Influence of hydrological parameters (e.g., permeability, porosity) on direction and extent of transport of chemical pollutants to groundwater
(3) Periodic and long-term changes of quantity and quality of groundwater.
(4) Groundwater quality parameters as indicators of groundwater flow
(5) Methods of quantity/quality studies

HS 3 HYDROLOGY OF HUMID TROPICAL REGIONS WITH PARTICULAR REFERENCE TO THE HYDROLOGICAL EFFECTS OF AGRICULTURE AND FORESTRY PRACTICE (ICSW) (cosponsored by UNESCO)

17–19 August 1983

Convenor: R. Keller, Geographisches Institut I, Albrecht-Ludwigs-Universität, Werderring 4, 7800 Freiburg, Federal Republic of Germany

Co-Convenor: L. Oyebande, Department of Geography, University of Lagos, Lagos, Nigeria

(1) Regional papers: Latin America and the Caribbean (Amazon, Central America, Caribbean), Africa (Central Congo, West Africa), Asia (India-Bangladesh, Southeast Africa, Australia-New Zealand).
(2) Papers on particular topics: evaporation and evapotranspiration; flood forecasting for heavy rainfall; effects of deforestation and sylviculture; tropical soils, hydrological properties and erosion; water quality, importance of groundwater; streamflow regime (and geomorphology); effects of agricultural measures on groundwater quality, adverse effects of land use on ecology; hydrological computation for water resources development with inadequate data: use of experimental basins (to obtain data); characteristic rainfall of tropical storms (time, spatial distribution, . . .); water resources management with regard to tropical precipitation characteristics (such as irrigation, agriculture, reservoir silting, flood prevention, etc.).

HS 4 SCIENTIFIC PROCEDURES APPLIED TO THE PLANNING, DESIGN AND MANAGEMENT OF WATER RESOURCES SYSTEMS (ICWRS) (cosponsored by UNESCO)

22–24 August 1983

Convenor: E. Plate, Institut Wasserbau III, Universität Karlsruhe, 7500 Karlsruhe, Federal Republic of Germany

Co-Convenor: G. Golubev, UN Environmental Programme, P.O. Box 30552, Nairobi, Kenya

(1) Hydrologic processes at the basin scale (including changes due to man's activity).
(2) Hydrological risk and reliability.
(3) The coupling of water quantity and water quality studies.
(4) Hydrology of irrigated lands.
(5) Hydrologic aspects of integrated river development.

HS 5 DISSOLVED LOADS OF RIVERS AND SURFACE WATER QUANTITY/QUALITY RELATIONSHIPS (ICCE/ICWQ) (cosponsored by UNESCO)

16–18 August 1983

Convenor: B. Webb, Department of Geography, University of Exeter, Amory Building, Rennes Drive, Exeter EX4 4RJ, United Kingdom

Co-Convenor: M. Gras, Electricité de France, Division des Etudes et Recherches, 6 Quai Watier, 78400 Chatou, France

(1) Global, regional, and local variations in dissolved loads and the factors which influence them.
(2) Magnitude and frequency characteristics of dissolved load records.
(3) Dissolved load composition and source; weathering budgets, denudational and non-denudational components.
(4) The role of dissolved loads in total denudation, the relative magnitude of particulate and dissolved loads.
(5) Effects of changes in quantitative parameters (channel roughness, discharge, etc.) on water quality.

IAHS Workshops

HS 6 NEW APPROACHES IN WATER BALANCE COMPUTATIONS (ICSW) (cosponsored by UNESCO)

22–23 August 1983

Convenor: A. van der Beken, Vrije Universiteit, Pleinlaan 2, 1050 Brussels, Belgium

Co-Convenor: A. Herrmann, Technische Universität, Langer Kamp 19c, 3300 Braunschweig, Federal Republic of Germany

(1) Water balance computation techniques: present status of the concepts of water balance models; data availability; scale in space and time; optimization techniques.
(2) Global, regional and local water balances: world water balances; regional water balances; national water balances; local water balances.

HS 7 HYDROLOGICAL ASPECTS OF TROPICAL CYCLONES (ICSW) (cosponsored by UNESCO and WMO)

16 August 1983

Convenor: R. Keller, Geographisches Institut I, Albert-Ludwigs-Universität, Werderring 4, 7800 Freiburg, Federal Republic of Germany

Co-Convenor: L. Oyebande, Department of Geography, University of Lagos, Lagos, Nigeria

Definition and catalogue of tropical humid areas affected by precipitation from cyclones; runoff and flood characteristics in these areas; problems of river discharge measurements in these areas; precipitation.

HS 8 GLACIER MASS BALANCE AND RUNOFF (ICSI)

25 August 1983

Convenor: V. Kotlyakov, Institut Geografii, Akademiya Nauk SSSR, Moscow, USSR

Co-Convenor: G. J. Young, Inland Waters Directorate, Environment Canada, Ottawa K1A 0E7, Canada

(1) Review of scientific progress and knowledge gained in mass balance studies of glaciers during the past 25 years, and the relevance of these studies to major problems of glacier hydrology, glacier response to climate, and to current and likely future studies of glaciers;
(2) review of the report on techniques of prediction of runoff from glacierized areas produced by the ICSI working group convened for this purpose, and to consider the indicated directions for most profitable future work in this field, especially as it may relate to mass balance or studies of glacier behaviour.

HS 9 LARGE-SCALE SNOW STUDIES (ICSI)
26 August 1983
Convenor: A. Rango, Hydrological Sciences Branch, Code 924, Goddard Space Flight Center, Greenbelt Maryland 20771, USA

Review of the progress and discussion of future activities of the ICSI Working Group on Large-Scale Snow Cover. The working group will invite selected discussion reports and welcome open contributions or comments concerned with the interaction between snow cover and climate on scales larger than 2500 km²; the large-scale hydrological effects of snow cover, and problems and techniques of regional snow cover management and handling of regional snow information.

HS 10 THE ROLE OF HYDROLOGY IN WATER RESOURCES SYSTEMS: EXPERIENCES AND PERSPECTIVES FOR THE FUTURE (ICWRS) (cosponsored by UNESCO)
25–26 August 1983
Convenor: E. Plate, Institut Wasserbau III, Universität Karlsruhe, 7500 Karlsruhe, Federal Republic of Germany
Co-Convenor: G. Golubev, UN Environmental Programme, P.O. Box 30552, Nairobi, Kenya

(1) Evaluation of the experience of countries in the application of results of hydrological and operational research in the implementation of water resources development and management (IHP Project A. 4.3.1).
(2) Water resources assessment as a contribution to the drinking water and sanitation decade.
(3) Urban hydrology.
(4) Scale problems in hydrology.
(5) Environmental aspects of water resources

HS 11 STRATEGIES FOR HYDROLOGICAL SCIENCES IN DEVELOPING COUNTRIES
22–23 August 1983
Convenor: N. B. Ayibotele, Water Resources Research Institute (CSIR), P.O. Box M32, Accra, Ghana

(1) Activities of relevance to the developing countries to be included in the Commission/Committee activities, and how to execute them.
(2) Experiences with use of mathematical models in hydrology in developing countries.

INTERNATIONAL ASSOCIATION FOR THE PHYSICAL SCIENCES OF THE OCEAN (IAPSO)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

Symposia under IAPSO leadership
No. 17 Low Latitude Coupled Ocean/Atmosphere Circulation
No. 19 Ridge Crest Hydrothermal Activity and the Chemistry of Sea Water
No. 20 Oceanic and Atmospheric Boundary Layers
No. 21 Coastal and Near Shore Zone Processes

Symposia in which IAPSO has an interest
No. 4 Geodetic Features of the Ocean Surface and their Implications
No. 5 Geophysics of the Polar Regions
No. 6 Data Management
No. 9 Assessment of Natural Hazards
No. 11 Structure and Composition of the Oceanic Crust
No. 15 Scientific Discoveries from MAGSAT Investigations
No. 16 Remote Sensing for Climate Studies
No. 18 Sea Ice Margins
No. 19 The Ocean and the CO_2 Climate Response

IAPSO GENERAL ASSEMBLY

The International Association for the Physical Sciences of the Ocean (IAPSO) General Assembly will be held concurrently with those of other IUGG Associations in Hamburg, Germany, 15–27 August 1983. The following is a listing of IAPSO symposia and other matters pertaining to the IAPSO Assembly.

National Reports
IAPSO will welcome National Reports and will distribute them to the delegates. It is estimated that 350 copies of each report will be needed.

Business Meetings
IAPSO plans to hold its first Plenary Session on the afternoon of Monday, 15 August, and its second Plenary Session on the morning of Thursday, 27 August 1983, at which time the Presidential Address, reports of Commissions, election of officers, adoption of resolutions and other matters will be taken up. An agenda of these meetings will be sent to all National Correspondents.

Submission of Abstracts
Most papers will be invited, but contributed papers will also be welcome. Any scientist wishing to present a paper in any IAPSO symposium should send a copy of his/her abstract to the appropriate convenor for acceptance. A second copy should be sent to the Secretary General, mailed in sufficient time to arrive not later than 15 March 1983. Names and addresses of the convenors are included on the following pages. The abstracts should contain the scientific content of the paper and not exceed 300 words. Instructions for preparation of abstracts for IAPSO abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX. All abstracts will be screened by the convenor who will arrange them in sessions and forward them to the Secretary General, to arrive before 15 April 1983. Abstracts will be printed by the German Organizing Committee in a collected abstract volume which will be available to IAPSO registrants in Hamburg.

Travel Funds
A small amount of money to cover partial travel expenses will be available for a few key invited speakers.

Additional Information
Information on IAPSO programs and activities may be obtained from:
Dr. Eugene C. LaFond
Secretary General, IAPSO
LaFond Oceanic Consultants
P.O. Box 7325
San Diego, California 92107 U.S.A.

IAPSO Symposia

PS 1 Effects of interfacial processes on the body of the ocean
Review and discuss recent results regarding basic processes of physics, chemistry and geology governing the oceanic cycling of substances including conditions of fluxes involved. Starting with an overview of various interfaces in the system, such as land-sea, air-sea, sediment-water, different oceanic regions should be considered with respect to their time range 10^1 to 10^3 or 10^4 years.
1 day sessions
Convenor: Professor G. B. Kullenberg, Institute of Physical Oceanography, University of Copenhagen, Haraldsgade 6, 2200 Copenhagen N, Denmark
Co-Convenors: Dr. Roger Chesselet, Centre des Faibles Radioactivités, Laboratoire mixte CNRS-CEA, P.O. No. 1, 91190 Gif-sur-Yvette, France
Dr. D. Schink, Department of Oceanography, Texas A and M University College Station, Texas 77843, U.S.A.
Dr. Scott Fowler, IAEA Laboratory, Monaco

PS 2 Large scale dynamics and circulation in the ocean
This symposium will review in depth the recent observations, theoretical and numerical modelling advances in understanding the large scale ocean processes and circulation. Structures from the scale of mesoscale eddies to that of the world ocean are involved. Topics to be considered include eddies and their role in mean circulation, boundary currents, their meander and detached rings, and large scale transports of properties, notably heat, in the ocean by eddies and mean circulation. Part of the symposium will be devoted to invited reviews of major field experiments of recent years (POLYMODE, NORPAX, INDEX, ISOS, etc.)
3 day sessions
Convenor: Dr. William R. Holland, NCAR, P.O. Box 3000, Boulder, Colorado 80307 U.S.A.
Co-Convenors: Professor A. S. Monin, Institute of Oceanology, Academy of Sciences of the U.S.S.R., 23, Krasikova Street, Moscow, 117218, U.S.S.R.
Professor W. Krauss, Institut für Meereskunde an der Universität Kiel, Düsternbrooker Weg 20, D 2300 Kiel, Fed. Rep. of Germany

PS 3 Intermediate scale motion and structures in the ocean
Scales of motion from the oceanic synoptic scale (the internal structure and dynamics and thermodynamics of eddies, upwelling and downwelling, and intense currents) to the oceanic mesoscale (fronts and long internal waves in association with eddies, upwelling and downwelling, and intense currents) plus tides and storm surges, together with their boundary effects.
2 day sessions
Convenor: Professor C. N. K. Mooers, Department of Oceanography, Naval Postgraduate School, Monterey, California 93940, U.S.A.
Co-Convenor: Dr. Dirk Olbers, Max-Planck Institut für Meteorologie, Bundesstraße 55, D-2000 Hamburg 13, Fed. Rep. of Germany

PS 4 Small scale motion and structures in the ocean
Internal waves, turbulence on scales of less than 100 meters; microstructure of salinity and other scalars; mixing phenomena; the circumstances which give rise to turbulence and mixing.
3/2 day sessions
Convenor: Professor Michael Gregg, Applied Physics Laboratory, University of Washington, 1013 N.E. 40th Street, Seattle, Washington 98105, U.S.A.

PS 5 Oceanographic problems of the North Sea and Baltic Sea
This symposium will address itself to theoretical and experimental results on dynamic processes in the low frequency range such as residual currents, long-term mixing and exchange processes, water and heat balance, and the role of shallow water fronts of the Baltic and the North Sea.
1 day sessions
Convenor: Professor O. Krause, Institut für Meeresforschung, Bremerhaven, Am Handelshafen 12, D-2850 Bremerhaven, Fed. Rep. of Germany
Co-Convenor: Professor A. Aitsam, Institute of Thermophysics and Electrophysics, Estonian SSR Academy of Sciences, Paldiski Str. 1, Tallinn 200031, U.S.S.R.

PS 6 Oceanographic advances from new technologies
Important progress in understanding ocean physics often follows from, or capitalizes upon, technical developments which afford wholly new types or greatly increased quantities of oceanographic observations. This symposium will consider recent results from such developments and prospects for further scientific advances. Emphasis will be on critical examination of scientific uses rather than on technology or engineering per se. Satellite oceanography and acoustic remote sensing of oceanic motions and structures are two of the developments to be discussed.
3/2 day sessions
Convenor: Dr. R. E. Stevenson, Office of Naval Research, Scripps Institution of Oceanography, La Jolla, California 92093 U.S.A.
Co-Convenors: Akad. B. A. Nelepo, Marine Hydrophysical Institute, Ukrainian SSR Academy of Sciences, 27 Lenin Street, Sevastopol, U.S.S.R.
Dr. P. Scully-Power, Naval Underwater Systems Center, New London, Connecticut 06320, U.S.A.

PS 7 Marine optics and optical modelling of the upper ocean
The optical dynamics of the upper ocean; modelling of physical/chemical/biological and optical characteristics of the upper mixed layer; radiant energy in the marine environment; the spatial and temporal variations of the optical properties of the ocean; marine photoecology and the optical modelling of primary productivity; marine optics and its application to other aspects of oceanography.
3/2 day sessions
Convenor: Dr. R. C. Smith, Department of Geography, University of California, 6707 Ellison Hall, Santa Barbara, California 93106, U.S.A.
Co-Convenor: Dr. A. Morel, Laboratoire d'Océanographie Physique, Université de Paris, Quai de la Darse, 06230, Villefranche-sur-Mer, France

PS 8 Chemical fluxes in the water column
Fluxes of elements, organic matter, and radionuclides as obtained from particle intercept traps and in situ filtration methods will be considered; intercalibration experiments and relevance to processes of sedimentation will be discussed.
1 day sessions
Convenor: Dr. S. Krishnaswami, Physical Research Laboratory, Navrangpura, Ahmedabad 380009, India
Co-Convenor: Dr. M. R. Bacon, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543, U.S.A.

PS 9 Deep and bottom water formation and circulation and topographic effects
Consideration of the several regions in which, and processes by which, deep and bottom water masses are formed in the world ocean; subsequent spreading, mixing, and circulation of these waters; topographic effects on their circulation.
2 day sessions
Convenor: Professor Knut Aagaard, Department of Oceanography WB-10, University of Washington, Seattle, Washington 98195, U.S.A.

PS 10 Seasonal and interannual variations in the oceans and atmosphere
Seasonal and longer period (event but not decadal) variations in the oceans and atmosphere, and the physical links between them. Large scale aperiodic ocean responses to atmospheric forcing. Sea surface temperature variations and short period climate changes.
Convenor: Professor Harry Charnock, Department of Oceanography, University of Southampton, Southampton SO9 5NH, England

PS 11 Physical, chemical and geophysical oceanography (Précis and poster sessions)
Water properties, ice, underwater acoustics, radiant energy, water motions, chemical interactions, sedimentation, geological structures, small bodies of water.
4 day sessions
Convenor: Dr. E. C. LaFond, LaFond Oceanic Consultants, P.O. Box 7325, San Diego, California 92107, U.S.A.
Co-Convenors: Professor Arturo De Maio, Istituto Universitario Navale, Facoltà Di Scienze Nautiche, Istituto Di Meteorologia E Oceanografia, I-80133 Napoli, Via Amm. Acton, 38, Italy
Dr. E. G. Morozov, Institute of Oceanology, Academy of Sciences of the U.S.S.R., 23, Krasikova Street, Moscow, 117218, U.S.S.R.
Professor S. H. Sharaf-el-Din, Oceanography Department, Faculty of Science, Alexandria University, Alexandria, Egypt

PS 12 Tsunami wave propagation (cosponsored by IASPEI)
Results and theory of tsunami wave propagation in the ocean and related seismic waves. Prediction and mitigation of tsunami effects will be included.
3/4 day sessions
Convenor: Professor T. Y. Wu, California Institute of Technology 104-44, Pasadena, California 91125, U.S.A.
Co-Convenor: Professor S. L. Soloviev, Institute of Oceanology, Academy of Sciences of the U.S.S.R., 23, Krasikova Street, Moscow, 117218, U.S.S.R.

INTER-UNION COMMISSION ON THE LITHOSPHERE (ICL)

PARTICIPATION IN IUGG INTER-DISCIPLINARY SYMPOSIA

ICL is interested in the following:
No. 1 Structures and Processes in Subduction Zones
No. 2 Lithospheric Deformations
No. 3 Crustal Accretion in and around Iceland
No. 5 Geophysics of the Polar Regions
No. 6 Data Management
No. 8 Assessment of Natural Hazards
No. 9 Time Dependent Processes and Properties in Planetary Materials
No. 11 Structure and Composition of the Oceanic Crust
No. 12 Plateau Uplift, Rifts and Volcanism
No. 16 Ridge Crest Hydrothermal Activity and the Chemistry of Seawater

ICL SYMPOSIA

1. Structure, Composition, and Dynamics of the Continental Lithosphere
Scope: The continental lithosphere exhibits many large scale structures connected with deep seated processes. These are more complex than the simple scheme of plate tectonics proposed for oceanic plates. They govern such geological surface phenomena as rifting, epirogenesis, basin formation or mountain building. Their understanding requires the study of physical and compositional properties. The dynamical modelling critically depends upon a good appraisal of the stress field produced by plate boundary interactions and internal density heterogeneities.
This symposium will therefore welcome relevant contributions from various fields: material science, petrology, geochemistry, seismology, gravimetry. It will particularly encourage presentations dealing with correlations of the various observables and modelling of the thermal and mechanical processes controlling the lithosphere evolution.
Schedule: 4 half-days
Convenors: Dr. Claude Froidevaux, Laboratoire de Géophysique, Université Paris-Sud, Bâtiment 510, F-91405 Orsay, France
Dr. Karl Fuchs, Geophysikalisches Institut, Universität Karlsruhe, Hertzstraße 16, D-7500 Karlsruhe, F.R. Germany
Dr. Peter Wyllie, Department of Geophysical Sciences, University of Chicago, 5734 S. Ellis Avenue, Chicago, IL 60637, USA

2. Passive Continental Margins
2.1 The Crustal Structure of Passive Continental Margins:
– Early rifting history of passive continental margins;
– Shallow and deep crustal structure of
(i) stretched and normal faulted passive continental margins,
(ii) and of passive continental margins which are characterized by massive outpouring of volcanic material resulting in the formation of voluminous wedges of "oceanward dipping subaerial basement reflectors" and/or volcanic build-ups;
– Physical and chemical composition of the stretched crust at a passive continental margin;
– Nature and significance of geophysical "edge" anomalies (gravity, magnetic, heat flow);
– Nature and origin of the Magnetic Quiet Zone (MQZ);
– Variations in velocity structure, thickness, physical and chemical properties across passive continental margins.
2.2 The Evolution of Passive Continental Margins:
– History of vertical movements (uplift and subsidence) at passive continental margins during their evolution;
– Variation of the tectonic movements across a passive continental margin;
– Nature, composition and tectonic movements of plateaus at passive continental margins;
– Thermal and mechanical models for the evolution of passive continental margins.
3.) "Global" unconformities and the synchronicity of tectonic and sea-level events at passive continental margins.
Convenors: Dr. Karl Hinz, Director and Professor, Bundesanstalt für Geowissenschaften und Rohstoffe, Stilleweg 2, Postfach 51 01 53, D-3000 Hannover 51, Fed. Rep. of Germany
Dr. Lucien Montadert, Institut Français du Pétrole, B. P. 311, 92502 Rueil-Malmaison, France

3. Appalachian and Hercynian Fold Belts
Scope: Modern study of orogenic belts places increasing emphasis on the integration of geological observations on surface rocks with geophysical observations of deeper rocks and particularly of the depth dimension of geological structures. For example, in the case of the Appalachian and Hercynian Belts, recent studies by seismic reflection profiling have given strong support to hypotheses involving thin-skinned thrusting as a major component of the deformation.
This symposium will bring together scientists from opposite sides of the Atlantic and from the disciplines of geology and geophysics to provide a comprehensive discussion of recent evidence and modern views on these important and enigmatic orogenic belts.
Schedule: three half days
Convenors: Prof. Dr. H. J. Behr, Geologisch-Paläontologisches Institut, Goldschmidtstr. 3, D-3400 Göttingen, Fed. Rep. Germany
Prof. Dr. J. Oliver, Dept. of Geological Sciences, Cornell University, Kimball Hall, Ithaca, N. Y. 14853 0126, U.S.A.
Prof. Dr. H. Zwart, Instituut voor Aardwetenschappen, Rijksuniversiteit Utrecht, Budapestlaan 4, NL-3508 TA Utrecht, The Netherlands

4. Desert Encroachment, Fast Tropical Erosion, and Coastal Subsidence and Submergence
The last few million years of Earth history have been characterized by rapid changes in surface condition such as the extension of ice sheets in high latitudes, the corresponding pluviation in middle latitudes, the migration of deserts and rainforests in low latitudes, and the consequent acceleration of erosion rates as vegetation was disturbed.
This symposium focuses on the four most dramatic geological processes of the Quaternary era. The contributions will aim to quantify our understanding of rates of change over various time scales (10^2 – 10^6 y) that prevailed over broad regions. Such an historical perspective provides a reliable background for studies of future trends. As well the broad regional scope serves to illustrate the variety of local responses to a given perturbation.
The interdisciplinary overview draws upon the wide range of studies encompassed by the INQUA Commissions on Shorelines, on Neotectonics and on Paleoclimatology, together with IGCP Projects on Sea Level, Glaciations, Paleohydrology and Floods.
Schedule: 4 half-days
Convenors: Prof. C. Fubara, Department of Surveying, University of Nigeria, Nsukka, Nigeria
Prof. H. Faure, Faculté des Sciences de Luminy, Case 907, 13288 Marseille, Cedex 2, France

Submission of Abstracts
Scientists wishing to present a paper in any ICL Symposium should send the original abstract to the Secretary General and a photocopy to the appropriate Convenor for acceptance. Abstracts should be mailed in sufficient time to arrive no later than 1 March 1983. Instructions for preparation of ICL abstracts are the same as for IUGG abstracts. These instructions are given in the ANNEX. All abstracts will be screened by the convenors who will arrange them in sessions and forward them to the Secretary General.
Abstracts will be printed by the Local Organizing Committee so that they will be available to registrants in Hamburg.

Additional Information
Additional information on ICL programmes and activities may be obtained from the Secretary General of ICL.

ANNEX 1

IUGG INTER-DISCIPLINARY SYMPOSIA
RESPONSIBILITIES OF THE CONVENORS AND ASSOCIATION REPRESENTATIVES
General Responsibility
Every convenor is assisted by Association Representatives. They are altogether responsible to the Union and their respective Association for the satisfactory conduct of the Symposium in their charge.

This responsibility includes
1. The selection of invited speakers and papers.
2. The collection of abstracts from which they will operate the screening of papers offered by contributors
3. The delivery of all the abstracts (IUGG Inter-disciplinary Symposia only) should be sent to
Local Organizing Committee IUGG 1983
Hamburg Messe und Congress GmbH
– Congress Organisation –
Postfach 30 23 60
D-2000 Hamburg 36
Federal Republic of Germany
taking care that they all will be received before 1 May 1983
It is strongly recommended to utilize the adopted format.
They will refer therefore to the instructions issued by the Organizing Committee a copy of which is here enclosed.
The local Organizing Committee will post to all convenors 50 sheets of the adopted format.
4. Keeping speakers to their allotted time.
5. The distribution to all contributors of the instructions for delivering the talk, for preparation and presentation of slides and manuscripts.
6. The quality of the oral presentation of each paper: The Union strongly emphasizes the fact that many in the audience have native tongues other than English or French. Therefore the speakers must speak slowly and very distinctly. The Convenors must check that the speakers are clearly understood in the back rows of the room. This is the most important recommendation from the Executive Committee of the Union.
7. Each Convenor must prepare, by the end of the week when his Symposium is held, an abstract of 2 to 5 pages long describing the highlights of the Symposium, the state of the problem and the future developments to be expected in the light of the Symposium's discussions. A list of presented papers can be given in Appendix but does not constitute in any way a report on the Symposium. This abstract will be published in the Chronicle. A rapid publication is obviously of major importance.

Screening and Presentation of Papers
– Screening should be based upon the scientific merit of the paper, new ideas, new results, new methods.
– (Except for papers from Taiwanese scientists) no papers will be read unless the author(s) are present.
– Papers not strictly related to the symposium's topic will not be accepted.
– A paper presented in one symposium cannot be accepted again in another symposium or in an Association meeting. Therefore a list of authors will be prepared and distributed.
– The normal maximum time for a presentation is 20 minutes plus a 5 minute discussion period. Speakers must keep to the allotted time. Invited papers could be offered more time. This is the responsibility of the Convenor.
– Pre-distribution of invited papers should be attempted.
– An abstract of one page must be prepared for the Abstract volume as well as to allow an objective judgement to be made on the quality of the contributed paper.
– Presentations with visual aids should be limited to about one slide per two minutes. Careful instructions are given below to insure that the material can be shown and read without delaying or detracting from the presentation.

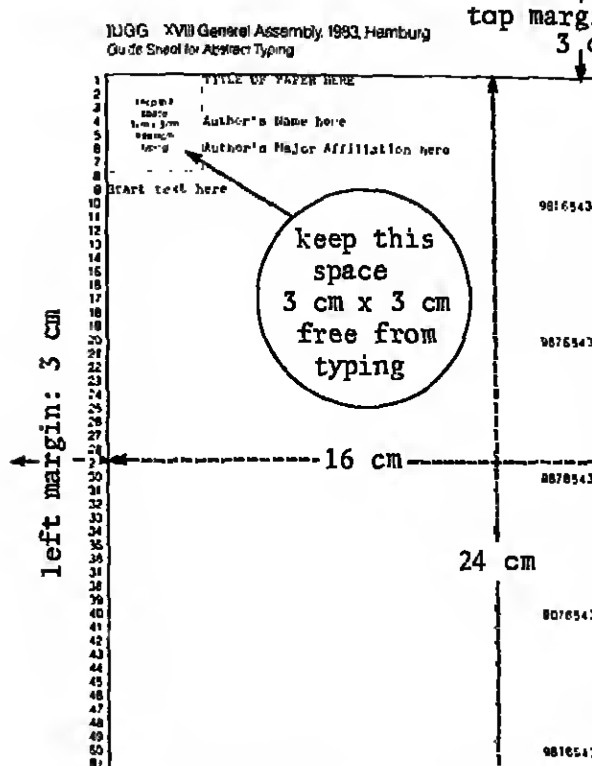
Timetable
– There must be no change in the day of session or symposium once it is published.
– Alterations in the speaker schedule will be allowed. Such changes must be announced. A central place will be used for these changes by all Associations and Commissions.
– It is up to convenors to establish their own rules of time maintenance within the published programme. Convenors could adopt discussions, reserve papers, etc. as needed.
At different places there will be information boards and these may carry the daily programme. They would reflect the latest timetable information on speakers and sessions.
Convenors must supply this timetable to the Local Organizing Committee so that it is possible for everybody to plan his activity and attendance.

Assembly of Abstracts
The Abstracts should be assembled by the Convenor in a desired order, preferably reflecting the anticipated order of presentation. No blank pages are to be inserted for abstracts not available at time of posting. The assembled order must be listed by the Convenor on a separate typewritten sheet and posted with the assembled Abstracts. According to this order a number must be assigned by the Convenor to each paper. This number will be inserted together with the Symposium number in the left corner of the Abstracts by the LOC.

Posting
All IUGG Inter-disciplinary Symposia Abstracts should be sent AIR-MAIL First Class from Convenors to the Local Organizing Committee (address see above) so that they will be received before 1 Mai 1983. It is strongly recommended that the Abstracts be protected by plastic film and cardboard to prevent any damage. It is further recommended that advice of the dispatch be sent by independent means such as airmail letter or telex.

ANNEX 2

INSTRUCTIONS FOR PREPARATION OF ABSTRACTS
The IUGG Inter-disciplinary and Association Symposia Abstracts will be printed by the offset process directly from the authors' manuscripts and reduced to A5 size paper. In order to facilitate this process the format must be standardized as set out below. Please note that all submissions will be photographed directly. There will be no opportunity for correction, and poorly prepared Abstracts may be rejected. Thus you are asked to take the utmost care.
Deadline for receipt of IUGG Inter-disciplinary Symposia Abstracts at the Convenor is 15 March 1983.



This page is 83 PICA 10 characters wide

Deadline for receipt of Association Symposia Abstracts is 15 March 1983, unless otherwise announced by the Associations and in this Circular.
Abstracts received after the deadline will not be accepted.

Use of the Guide Sheet
A guide sheet is included in this Circular. All text and illustrative material should not exceed one page and must be contained within the outlines of the guide sheet. Other size forms must not be used. Please use white paper of A4 size (21.0 x 29.7 cm). If A4-size paper is not available, you may use 8.5" x 11" paper, which is 0.6 cm wider than an A4 sheet. Keep 3 cm margin on the left and 3 cm on the top edge of the paper. As the Abstracts will be photographed directly the preparation of the Abstracts is required to be performed with the utmost care in following the subsequent guidelines:
1. An electric typewriter should be used, if possible, with 10 characters per inch. Type bars should be clean. A carbon ribbon should be used, if possible, otherwise a reasonably new, good quality, black ribbon.
2. Carbon paper or other copies cannot be accepted.
3. Begin paragraphs at left margin and use single spacing, but allow double spacing between paragraphs.
4. The title of the paper, the name(s) of the author(s), the institution and country should be typed directly onto indicated lines (see example given below), with 3 cm indentation from the left edge of the typing area (i. e. 6 cm from the left edge of the paper).
Example:
TSUNAMI PROPAGATION IN THE PACIFIC OCEAN
M. Engel and W. Zahel
Institut für Meereskunde, Universität Hamburg
Federal Republic of Germany
5. If you include illustrations, they should be firmly mounted in their proper places. Figure numbers and captions should be typed in the desired place near the corresponding illustrations, photographs must be prepared with good contrast on glossy finish paper and should have the same range of density. Lettering should be clear (black or white). Line drawings, graphs and diagrams should be photographic reproductions of black and white drawings.
6. Abstracts may be submitted in either of the official languages, French or English.
7. If you need to fold Abstract sheets, please fold carefully between the typed lines, so as to produce no damage on typed lines or illustrations.
8. For IUGG Inter-disciplinary Symposia send all Abstracts AIR-MAIL First Class to your relevant Convenor, as stated in this Circular. It is recommended to advise of the dispatch by separate letter or telex.

For Association Symposia, please see remarks below.

IAG:	Deadline for receipt of abstracts is 1 March 1983. Send all abstracts AIR-MAIL First Class to the Secretary General. It is recommended to advise of the dispatch by separate letter. One photo-copy of your abstract should be sent independently to your convenor of Symposium and to the President of the concerned Section. The Abstracts will be reviewed by a Committee consisting of the Presidents of Sections and the authors will then be informed of the decision concerning their papers.
IASPEI:	Deadline for receipt of abstracts is 15 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the convenor.
IAVCEI:	Deadline for receipt of abstracts is 15 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the first convenor concerned.
IAGA:	Deadline for receipt of abstracts is 15 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the first convenor concerned.
IAMAP:	Deadline for receipt of abstracts is 1 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the convenor.
IAHS:	Deadline for receipt of abstracts is 31 October 1982. (see description of IAHS programme)
IAPSO:	Deadline for receipt of abstracts is 15 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the appropriate convenor.
ICL:	Deadline for receipt of abstracts is 1 March 1983. Send your original abstract to the Secretary General, and a photo-copy to the appropriate convenor.

ANNEX 3

GUIDE-LINES FOR AUTHORS/SPEAKERS
Guide-Lines for Delivering the Talk
1. Get in touch with your session Chairman upon your arrival and not later than 24 hours before the session in order to confirm your participation and to enable him to establish the final-table, which he will communicate to the projectionist.
2. Don't read, just glance once in a while at your written "oral" version. Learn this version well enough to allow that.
Don't hurry to make a point. If you work from a set of notes that you've prepared from the "oral English or French" version of your talk, your pace will be such that your audience will keep up.
Make your oral presentation a transparent framework supporting the basic idea of your paper. Be aware of the fact that within 15 minutes you can hardly communicate more than a single essential message to your audience.
Let your talk reflect your personal engagement in the subject giving the audience a chance to grasp your fundamental ideas for better understanding of the scientific content of your paper.
3. Use short sentences; pause between ideas for the digestion of facts.
4. If this is your first talk, memorize your introduction. By the time you're through this part, you will be used to your surroundings and the audience.
5. Stand in a normal manner, don't fidget or stare fixedly into one corner of the room.
6. Don't overrun your time. Practice an accelerated ending; then when the timer warns you that your time is nearly finished, go into your concluding remarks.

Preparation of Manuscripts
You are asked to bring a copy of your manuscript to the Meeting for subsequent publication in the Proceedings. In general, the length should be no more than about 20 manuscript pages (21 x 28 cm, 25 lines to the page). Manuscripts should be typed double-spaced on one side only, with title, author's name and institution at top. They should be complete with illustrations and must include lists of references and figure captions.

Rules for Preparation of Slides.
1. Keep it simple. Unless the material on the slide can be comprehended at a glance, it defeats its own purpose. A slide should not have on it detail that is not needed or data that are not referred to in the talk. A slide should be limited to the presentation of one idea. Try to express one idea per slide, and use more slides rather than combine too many ideas on any one slide.
2. Keep it uncluttered. Illustrations intended for publication are seldom suitable for slide presentation. Fill the entire area available but do not clutter the slide with needless detail.
a. Make the curves or important outlines heavy.
b. Eliminate the legend if possible. Label curves or use colour instead.
c. Reduce number of words on a slide to 15 if possible.
d. Omit explanatory details, supporting data, tables, etc.
e. Avoid tables; use a graph or a simple line diagram.
3. Plan your slides so that they are legible. Some useful guidelines are:
– Slides should be readable when held in the hand at a distance of 25 cm from the eye.
– A convenient procedure is to type into an area three times as large as the actual slide (i. e., 75 x 105 mm). Capital letters should be 2.5 mm high (Pica size), and no more than 5 lines should appear on each slide.
In preparing transparencies for an overhead projector, use capital letters from 1 to 2 cm high. Lines should be 1 mm wide.
4. Use colour. Colour attracts attention and enhances the illustration. Different zones of a map can be separated more easily with colour and curves can be distinguished more easily.
5. Avoid large areas of white background which produce glare and eyestrain. This can be eliminated by using a soft colour tint over all.
6. Use standard size and format. Only 5 cm x 5 cm slides will be accepted but overhead projectors will be available.
7. Label and number your slides properly
a. Thumb-spot should be well marked in the lower left-hand corner on the face of the slide when held in the right reading position. In this position the slide number on the thumb spot will appear inverted. Spots should be placed on mask. Then the slide number will appear in the right upper corner when the slides are stored in the projector cassette.
b. Slides should be delivered in boxes labelled with the speaker's and symposium's name, date of session and paper number. Slides should be numbered consecutively with each number appearing only once.
c. Duplicate slides, numbered in proper order, must be provided if you wish to show the same illustration more than once during your talk.

Presentation of Slides
1. Where and when to hand in and to withdraw your slides
The projectionist will be at your disposal in the meeting room 30 minutes before the announced starting time. He must have all slides no later than 15 minutes before the session starts in order to fill the slide container. The projectionist is not permitted to accept or return slides during the session.
Withdraw your slides from him at the end of the session, or before the following session of the same meeting.
2. When the slide is first put on the screen, allow the audience several seconds to study the slide before talking about it. The audience can't study the slide and listen to you at the same time. This is another reason for keeping the slide simple – if the slide requires extended study, the audience must choose between understanding the slide or listening to you. Never use slides to show extensive formula deductions.
3. Have contact prints made of your slides. They can be numbered and put in their proper order in your notes. Thus you won't have to turn your back on the audience and lose "microphone contact".
4. Have a large identifying letter or character or colour on the slide that calls attention to the feature you wish to point out. This obviates the need for a pointer.
5. Use each slide only once. If you must refer to the same slide at different times in your talk, use a duplicate slide. You will not be able to recall a slide after you've passed on to the next.
6. Be prepared to jump over some of your slides and go directly to a concluding slide if you're running short of time. Have this "jump to" slide tabbed and know its number so you can tell the projectionist without having to flash through intermediate slides.

Projection Facilities
Equipment for slide presentation (50 mm x 50 mm frames) and overhead projection will be available.
If 8 mm or 16 mm film projectors (only a limited number of projectors is available) or twin slide projectors should be needed the authors are required to inform the Local Organizing Committee before May 1st, 1983

Geophysical Year

The complete Geophysical Year last appeared in the December 21, 1982, *Eos*.
A boldface meeting title indicates sponsorship or cosponsorship by AGU.

New Listings

May 1983 Sixth World Conference on Ozone, Washington, D. C. Sponsor, International Ozone Association. (IOA, Tower Suite 510, 301 Maple Avenue West, Vienna, VA 22180.)

May 2–27, 1983 Ninth World Meteorological Congress, Geneva, Switzerland. Sponsor, World Meteorological Organization. (WMO, 41 avenue Giuseppe Motta, Case Postale 5, CH-1211, Geneva 20, Switzerland.)

May 9–13, 1983 17th International Symposium on Remote Sensing of the Environment, Ann Arbor, Mich. Sponsor, Environmental Research Institute of Michigan. (ERIM, P.O. Box 8618, Ann Arbor, MI 48107.)

May 18–20, 1983 Sixth Congrès Mondial pour la Qualité de l'Air, Paris. Sponsor, Union Internationale des Associations pour la Prévention de la Pollution Atmosphérique. (UIAPPA, 62 rue de Courcelles, 75008 Paris.)

June 12–25, 1983 Seventh Annual Conference, Kingston, R. I. Sponsor, University of Rhode Island, Center for Ocean Management Studies. (Center for Ocean Management Studies, Kingston, RI 02881).

June 1983 Ninth Conference of Aerospace and Aeronautical Meteorology, Omaha, Neb. Sponsor, American Institute of Aeronautics and Astronautics and American Meteorological Society. (AIAA, Meeting Department, 1290 Avenue of the Americas, New York, NY 10019, or AMS, 45 Beacon Street, Boston, MA 02108.)

September 19–25, 1983 International Symposium on the Geology of the Taurus Belt, Ankara, Turkey. Sponsor, The Mineral Research and Exploration Institute of Turkey and The Geological Society of Turkey. (Maden Tetkik ve Arama Enstitüsü (MTA), Toros Jeolojisi Uluslararası Simpozyumu, Düzenleme Kurulu, Ankara, Turkey.)

October 17–20, 1983 15th Annual Meeting, Ithaca, N. Y. Sponsor, Division for Planetary Science of the American Astronomical Society. (Steven J. Ostro, Space Science Building, Cornell University, Ithaca, NY 14853.)

Changes

June 13–15, 1983 **International Symposium on Gas Transfer at Water Surfaces.** See Geophysical Year, *Eos*, December 21, 1982. The symposium is being supported by the Environmental Protection Agency.

AGU

1982 New Member Sponsors

One hundred and forty-six new members were elected in November 1982. The AGU members who sponsored them are listed below.

10,000 Member Sponsors

Five Members: Robert T. Hodgson. **Four Members:** Robert L. DuBois. **Three Members:** Dennis Nelson, B. E. Schutz. **Two Members:** Robert S. Crosson, Carl Kisslinger, Robert B. Smith.

One Member: Mangalatayil Ali Abdu; Walter Alvarez; William A. Bassett; Terry E. Battalino; Myrl Beck, Jr.; Hugh F. Bennett; Eduard Berg; Francis S. Birch; David D. Blackwell; Melvin L. Blevins; Gerard C. Bond; Theodore J. Bornhorst; Ed Boyle; Thomas Mark Brocher; A. Brock; David A. Brooks; James N. Brune; Roger G. Burnside; Nel Caine; Donald B. Campbell; Bobb Carson; C. H. Chapman; Randall J. Charbeneau; J. V. Chernosky, Jr.; B. J. Choudhury; Terry Chriss; Clarence S. Clay; John Robert Clements; James W. Crosby III; Joseph Curray; Robert A. Dalrymple; E. Julius Dasch; Russ E. Davis; Kees A. DeJong; W. G. Deuser; William R. Dickinson; Steven R. Dickman; Jimmy F. Diehl; George C. Dunne; Thomas Dunne; Robert F. Dymek.

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Membership Update

The following individuals have been added to the list of Supporting Members which was last published in the November 30, 1982, EOS.

Life Supporting Member

A. Ivan Johnson.

Individual Supporting Members

Frank C. Ames, Kinsey A. Anderson, Charles C. Counselman III, Charles L. Drake, Peter S. Eagleson, E. R. Engdahl, Robert D. Fletcher, William C. Grausteln, John A. Knauss, Worth D. Nowlin, Jr., Joseph L. Reid, Claes G. H. Rooth, William B. F. Ryan, Kenneth C. Spengler, Thomas W. Stern, George H. Sutton, M. Nafi Toksoz, Richard P. Turco.

Membership Applications Received

Applications for membership have been received from the following individuals. Their proposed primary section affiliation is shown after the name.

Regular Member

Michael E. Bentley (H), Hugh E. Bevans (H), Alan Brandt (O), Phillip Durgin (H), Terry L. Erlewine (H), Ronald J. Ferek (A), Robert W. Gillham (H), Donald R. Hastie, Forrest M. Holly, Jr. (H), Paul A. Hwang (O), M. Aslam Khan Khalil (A), T. Kurtis Kyser (V), Richard J. McGlimans (H), Patrick N. McGuire (H), Peter A. Mock (H), Robert J. Reed (T), Michael E. Schlesinger (A), Kai Sorensen (T), Bernhard Storre (V), Garth Van der Kamp (H), Carol A. Whitaker (H), T. M. L. Wigley (A), Alex K. Williamson (H)

The June Bacon-Bercey Scholarship in Atmospheric Sciences for Women 1983–1984

Expressly for women intending to make a career in the atmospheric sciences. This monetary assistance, provided through a gift from June Bacon-Bercey, a noted meteorologist, will be given to a woman who shows academic achievement and promise. To qualify, candidates must be one of the following:
• a first-year graduate student in an advanced degree program in atmospheric sciences;
• an undergraduate in a bachelor's degree program in atmospheric sciences who has been accepted for graduate study;
• a student at a 2-year institution offering at least six semester hours of atmospheric sciences, who has been accepted for a bachelor's degree program, and who has completed all of the courses in atmospheric science offered at the 2-year institution.

Awardee selection will be made by the AGU Subcommittee on Women in Geophysics in consultation with the AGU Atmospheric Sciences Section.

For application forms contact:
American Geophysical Union
Member Programs Division
2000 Florida Avenue, N.W.
Washington, D.C. 20009
462-6903
800-424-2488 outside the Washington, D.C. area
Application Deadline
May 1, 1983

Student Member

Sharon Deemer (H), Raymond Gahan (S), Huseyin G. Iz (G), John R. Nelson (T), Ray G. Peterson (O), William K. Witte (T)

Associate Member

E. Russell Johnston, III (H)

GAP

Separates

To Order: The order number can be found at the end of each abstract; use all digits when ordering. Only papers with order numbers are available from AGU. Cost: $3.50 for the first article and $1.00 for each additional article in the same order. Payment must accompany order. Deposit accounts available.

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Exploration Geophysics

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show that margaritasite can form by reaction of Cs-rich solutions with natural carnotite at 200°C, but the same reaction does not occur or is too slow to be observed in 61 days at 80°C. It appears unlikely that margaritasite occurs in any Colorado Plateau-type uranium deposit. Reported "carnotite" occurrences from uranium deposits of probable hydrothermal origin are likely sites for new discoveries of margaritasite.
Am. Min., 67, 11-12

4219 Properties of Minerals
IDENTIFYING THE COORDINATION OF SILICON BY MAGIC-ANGLE-SPINNING NMR: STISHOVITE AND QUARTZ
John M. Thomas, Jose S. Gonzalez-Calbet, Colin A. Fyfe, Glen C. Gobbi, and Malcolm Nicol (Department of Chemistry and Biochemistry, University of California, Los Angeles, California 90024, U.S.A.)
Six-coordinated Si in stishovite yields a sharp 29Si MASNMR signal at −191.3±2.2 ppm from TMS, well-removed from the characteristic signal associated with tetrahedral coordination in quartz, cristobalite, and other, less crystalline siliceous solids.
Geophys. Res. Lett., Paper 1L1592

Oceanography

4705 Oceanography (Boundary Layer and Exchange Processes)
ARCTIC POLYNYA II. STRUCTURE OF TURBULENCE AND SENSIBLE HEAT FLUX
S. D. Smith (Bedford Institute of Oceanography, Dartmouth, N. S., Canada B2Y 4A2), R. J. Anderson, G. den Hartog, D. R. Topham, and R. G. Perkin
The Dundas Island Polynya is a natural laboratory for the study of atmospheric turbulence and heat exchange between the Arctic Ocean and the atmosphere in extreme (28 to 34°C) sea-air temperature differences.
A sonic anemometer-thermometer measured wind and temperature fluctuations at a height of 4.4 m at the downwind edge, where turbulent heat flux was characteristic of the surface flux from the polynya. Profiles of wind, temperature, and temperature fluctuations were also measured. Temperature ramps associated with the passage of convective plumes give skewed temperature distributions. Sensible heat flux is related to wind speed and sea-air temperature difference by a stability-dependent bulk coefficient. Formulae describing turbulence structure in convective boundary layers are verified and compared with published results taken in less extreme temperature gradients. Using these formulae, heat flux can be estimated from either temperature variance or temperature spectra.
J. Geophys. Res., Green, Paper 2C1708 12/12

4718 Chemical Oceanography
GEOCHEMICAL PROFILES IN THE CENTRAL ARCTIC OCEAN: THEIR RELATIONSHIP TO FREEZING AND SHALLOW CIRCULATION.
R.M. Moore (Dept. of Oceanography, Dalhousie University, Halifax, Nova Scotia, Canada. B3H 4J1), M.G. Lowings and F.C. Tan.
Temperature, salinity, nutrient, tritium and oxygen isotope data were collected along an ice-station drift track extending from 85° 18'N 139 58'W to 89°8'N 97 7'W between the Makarov and Fram Basins in the central Arctic Ocean. The relationship of these quantities to the processes that maintain the halocline, in particular to the production of more saline waters by addition of brines formed during the freezing of seawater, is described. The results support the idea that the wide continental shelves of the Arctic

5320 Cosmic ray effects in meteorites
RADIATION HISTORY OF LUNAR MICROBRECCIAS AND LITHIC CHONDRULES FROM WESTON METEORITE BY TRACK DATA
L.L.Kashkarov (Vernadsky Institute of Geochemistry and Analytical Chemistry, Academy of Sciences, Moscow 117334, USSR), L.I.Genaeva, L.S.Tarasov, O.V.Sarychnikova, A.K.Lavrukhina
Tracks generated in the lithic chondrules of the brecciated Weston 84-7 meteorite and in the lunar microbreccias from the "Luna16" and "Luna24" columns by iron group nuclei of solar cosmic rays were studied. The results for about 2000 olivine and pyroxene grains, contained in 67 lithic chondrules indicate that a relict irradiation of the material occurred at an early stage in solar system formation, i.e. before the chondrules were assembled. The results for about 1000 olivine and pyroxene grains in 13 microbreccias suggest the part of chondrules from Weston meteorite containing solar flare irradiated crystals have been formed in processes analogous to the impact formation of microbreccias on the lunar regolith without heating of compacted material up to temperature of 600 – 700°C. (Meteorite, particle tracks, lunar microbreccias).
J. Geophys. Res., Red, Paper 1B1501

5340 Shock waves
ACCELERATION OF LOW ENERGY PROTONS AND ALPHA PARTICLES AT INTERPLANETARY SHOCK WAVES
M. Scholer (Max-Planck-Institut für Physik und Astrophysik, Institut für extraterrestrische Physik, 8046 Garching, F.R.G.), F.M. Ipavich, G. Gloeckler and D. Hovestadt
We have investigated low energy protons and alpha particles in the energy range ~30 keV/charge to ~150 keV/charge associated with three different interplanetary shock waves in the immediate pre- and postshock region. The data were obtained with the Max-Planck-Institut/University of Maryland sensor system on ISEE-3. In particular, we present spatial distributions in the pre- and postshock medium as measured in the spacecraft frame and after transformation into the solar wind and the shock frame of reference, respectively, the dependence of the phase space density at different energies on distance from the shock and the form of the distribution function of both

Mineralogy, Petrology, and Crystal Chemistry

Particles and Fields—Interplanetary Space

Particles and Fields—Ionosphere

Particles and Fields—Magnetosphere

5715 Electric Fields
SOLITARY WAVES AND DOUBLE LAYERS ON AURORAL FIELD LINES
M. K. Hudson (Space Sciences Laboratory, University of California, Berkeley, CA 94720), W. Lotko, I. Roth and E. Witt
Time-stationary solutions to the Vlasov-Poisson equation for ion holes and double layers are examined along with particle simulations which pertain to recent observations of small amplitude $e\phi/T_e \lesssim 1$ electric field structures on auroral field lines. Both the time-stationary analysis and the simulations suggest that the observed double layers evolve from holes in ion phase space. Multiple small amplitude double layers, as seen in long simulation systems, are observed to propagate past the spacecraft and may account for the acceleration of plasma sheet electrons to produce inverted V's.
J. Geophys. Res., Blue, Paper 2A1160

5720 Interactions between solar wind and magnetosphere
PLASMA REST FRAME FREQUENCIES AND POLARIZATIONS OF THE LOW FREQUENCY UPSTREAM WAVES: ISEE-1 AND -2 OBSERVATIONS
M. H. Hoppe (Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA, 90024), and C. T. Russell
Using magnetic field data from the dual ISEE-1 and -2 spacecraft we have determined the plasma rest frame frequencies and polarizations of the large amplitude low frequency (0.03 Hz) upstream waves. The monochromatic sinusoidal waves associated with "intermediate" ion fluxes are magnetosonic waves with rest frame frequencies $\sim 0.1\ \Omega_p$ and wave lengths $\sim 1\ R_e$. The obliquely propagating "shocklet" form of the waves is also predominantly in the magnetosonic mode, but occasionally also appears in the Alfven mode with similar rest frame frequency and wavelength. The generation of the magnetosonic mode has been explained by the well established cyclotron resonance mechanism driven by narrow reflected ion beams but the concurrent observation of Alfven mode waves appears to require wave generation by the more isotropic diffuse ion distributions as well. (Upstream waves).
J. Geophys. Res., Blue, Paper 2A1851

5720 Interactions between solar wind and magnetosphere
SOLAR WIND CONTROL OF THE LOW-LATITUDE ASYMMETRIC [illegible]

Physical Properties of Rocks

6110 Elasticity, fracture, and flow
INVESTIGATION OF INTERNAL FRICTION IN FUSED QUARTZ, STEEL, LUCITE AND WESTERLY GRANITE FROM 0.01 to 1.00 Hz AT 10^{-8}–10^{-7} STRAIN AMPLITUDE
H.-P. Liu (U.S. Geological Survey, Menlo Park, California, 94025) and L. Peselnick
A detailed evaluation on the method of internal friction measurement by the stress-strain hysteresis loop method from 0.01 to 1 Hz at 10^{-8} to 10^{-7} strain amplitude is presented. Significant systematic errors in relative phase measurement can result from convex end surfaces of the sample and stress sensor and from end-surface irregularities such as nicks and asperities. Preparation of concave end surfaces polished to optical smoothness having a radius of curvature >3.6 x 10^4 cm reduces the systematic error in relative phase measurement to <(5.5±2.1) x 10^{-4} radians. The values of Q_E^{-1} (internal friction under uniaxial compression) determined from the relative phase measurements are: $|Q_E^{-1} - Q_S^{-1}| < 4.6 \times 10^{-4}$ for the tool steel sample and $|Q_E^{-1} - Q_S^{-1}| < 2.8 \times 10^{-3}$ for the Westerly granite sample, where Q_S^{-1} is the internal friction of the fused quartz stress sensor under uniaxial compression. These values are consistent with those inferred from the relative modulus dispersion data also presented in this paper. The lucite sample shows high values of internal friction ($Q_E^{-1} \sim 5 \times 10^{-2}$) with strong frequency dependence and with a maximum in Q_E^{-1} at ~ 0.4 Hz.
J. Geophys. Res., Red, Paper 2B1978

6110 Elasticity, fracture, and flow
DEFORMATION OF SINGLE CRYSTAL CLINOPYROXENES: II DISLOCATION - CONTROLLED FLOW PROCESSES IN HEDENBERGITE
J. J. Kolle and J. D. Blacic (Geophysics Group, ESS-3, Los Alamos National Laboratory, Los Alamos, New Mexico 87545)
Laboratory deformation experiments were carried out on two single crystal clinopyroxenes, chrome diopside [illegible]

[illegible]

Planetology

6510 Atmospheres of planets
THE SATURN SPECTRUM IN THE EUV – ELECTRON EXCITED HYDROGEN
D. E. Shemansky (Center for Space Sciences, University of Southern California, 3625 E. Ajo Way, Tucson, Arizona, 85711), and J. M. Ajello
Recent laboratory observations of electron excited H_2 in the EUV have brought about the realization that higher Rydberg series band systems make a significant contribution to the emission spectrum. Theoretical cross-section estimates for the excitation of the D, D', B', B" states agree with these results. Model calculations for particle excitation of the Saturn atmosphere including the higher states now show excellent agreement with Voyager auroral and dayside equatorial spectra. The model data also confirm the relative spectral response calibration of the Voyager instruments, providing a basis for accurate analysis of the excitation processes on both Jupiter and Saturn. (Hydrogen atmospheres, Saturn, electron excitation).
J. Geophys. Res., Blue, Paper 2A1400

6535 Moon (Magnetic Field)
MAGNETIC DIPOLE MOMENT ESTIMATES FOR AN ANCIENT LUNAR DYNAMO
K. A. Anderson (Physics Department and Space Sciences Laboratory, University of California, Berkeley, CA 94720)
The four measured planetary magnetic moments combined with a recent theoretical prediction for dynamo magnetic fields suggests that no dynamo exists in the Moon's interior today. For the Moon to have had a magnetic moment in the past of sufficient strength to account for at least some of the lunar rock magnetism, the rotation would have been about twenty times faster than it is today and the radius of the fluid, conducting core must have been about 750 km. The argument depends on the validity of the Busse solution to the validity of the MHD problem of planetary dynamos.
J. Geophys. Res., Red, Paper 2B1419

6530 Gross properties of planets
R. D. Rosenberg (Department of Earth and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139), and S. C. Solomon
COMMENT ON "ELASTIC THICKNESS OF THE VENUS LITHOSPHERE ESTIMATED FROM TOPOGRAPHY AND GRAVITY" BY A. CAZENAVE AND K. DOMINH

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